At a meeting of the Faculty, held April 26th, 1876, the following resolution was adopted, in regard to raising the standard of requirements for admission to the University:

Resolved—

1. That at and after the Entrance Examinations of 1877, all candidates for admission to the University will be required to submit to an examination, in addition to the existing requirements, in the following subjects:

(*a*) Plane Geometry.

(*b*) Physiology, Dalton's, Huxley and Youman's, or Cutter's "Physiology and Hygiene."

(*c*) Physical Geography.

(*d*) The Metric System of weights and measures.

2. That of all candidates for admission to the Courses in Science, Literature, Philosophy, Natural History, and Chemistry and Physics, an examination will be required also in the principles of French Grammar and Construction (Otto's Grammar preferred), and the first book of Voltaire's Charles XII, or its equivalent; or instead of French, the principles of German Grammar and Construction (Whitney's or Comfort's Grammar preferred), and seventy-five pages of Whitney's Reader, or its equivalent.

3. For admission to the Courses in Architecture and Civil Engineering, besides what is embraced in the first section of this resolution, an examination will be required in Solid Geometry, and Plane Trigonometry, in accordance with the modern system which defines the trigonometric functions as ratios of the sides of right triangles, including the theory and use of Logarithms.

G. C. CALDWELL, *Secretary*.

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Preparatory Instruction.

A special class in studies required for admission to the UNIVERSITY will be formed at

ITHACA, MONDAY, JUNE 19,

(six days after the June Entrance Examinations,) under the supervision of the undersigned, graduates of Cornell, and will be continued until the September Examinations. Students will, however, be received at any time after May 15, and throughout the summer.

Individual instruction will be given if so desired.

For particulars, address

A. C. GREENE, B. C. E.
D. R. HORTON, B. S.
65 E. Mill St., Ithaca, N. Y.

References, PRES. A. D. WHITE,
PROF. W. D. WILSON,
Registrar of the University.

1875-79

THE

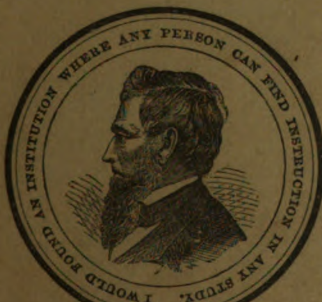
CORNELL

University Register

AND CATALOGUE

1874-75

THIRD EDITION



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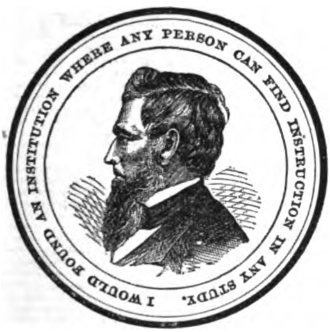

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Contents.

The Calendar.

1874-5—SEVENTH YEAR.			
1874		**Sept. 7**	**Fall Term.**
September	7	Monday	Entrance Examinations.
September	8	Tuesday	Entrance Examinations continued.
September	9	Wednesday	REGISTRATION for the Term.
September	10	Thursday	Instruction begins.
November		Thursday	THANKSGIVING DAY.
December	14	Monday	Term Examinations begin.
December	18	Friday	Term Examinations end.
December	22	Tuesday	Term ends.
1875		**Jan.**	**Winter Term.**
January	5	Tuesday	Entrance Examinations.
January	6	Wednesday	REGISTRATION for the Term.
January	7	Thursday	Instruction begins.
January	11	Monday	FOUNDER'S DAY.
February	22	Monday	WASHINGTON'S BIRTHDAY.
March	22	Monday	Term Examinations begin.
March	26	Friday	Term Examinations end.
March	27	Saturday	Spring Recess begins.

1875		Mar. 30	Spring Term.
March	30	Tuesday	Entrance Examinations.
March	31	Wednesday	REGISTRATION for the Term.
April	1	Thursday	Instruction begins.
April	27	Tuesday	CHARTER DAY.
May	14	Friday	Woodford Prize Competition.
May	24	Monday	Commencement Essays handed in.
May	30	Sunday	DECORATION DAY.
June	7	Monday	Term Examinations begin.
June	12	Saturday	Term Examinations end.
June	14	Monday	Entrance Examinations.
June	15	Tuesday	Entrance Examinations end.
June	16	Wednesday	Annual Meeting of Associate Alumni.
June	17	Thursday	ANNUAL COMMENCEMENT.

1875-6—EIGHTH YEAR.

1875		Sept. 13	Fall Term.
September	13	Monday	Entrance Examinations.
September	14	Tuesday	Entrance Examinations continued.
September	15	Wednesday	REGISTRATION for the Term.
September	16	Thursday	Instruction begins.

Officers of the University.

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LIBRARIAN, *Professor of North European Languages.*

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Secretary of the Faculty.

BURT G. WILDER, B. S., M. D., 58 Cascadilla.
Professor of Comparative Anatomy and Zoölogy.

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Non-Resident Professor of English Literature.

GOLDWIN SMITH, L. H. D., Toronto, Canada.
Non-Resident Professor of English History.

JAMES LAW, F. R. V. C., University Hill.
Professor of Veterinary Medicine and Surgery.

THEODORE W. DWIGHT, LL. D., New York City.
Non-Resident Professor of Constitutional Law.

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*Arranged, with the exceptions of the officers of the Faculty, in the order of seniority of appointment. In case, however, any Professor has been an Assistant-Professor first, his name occurs in the order of the date of the latter appointment.

CHARLES FRED. HARTT, M. A., 1 Heustis St.
Professor of General, Economic and Agricultural Geology.

ALBERT N. PRENTISS, M. S., 116 Cascadilla.
Professor of Botany, Horticulture and Arboriculture.

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Professor of Mechanical Engineering and Machine Construction.

ZIBA HAZARD POTTER, M. A., M. D., Cor. Seneca and Tioga.
Assistant Professor of Mathematics.

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Non-Resident Professor of Mechanics applied to Agriculture.

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ALFRED STEBBINS, M. A., 110 N. Aurora.
Assistant Professor of South European Languages.

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*Died since the Register was in press.

LUCIEN A. WAIT, B. A., 100 Cascadilla.
Assistant Professor of Mathematics.

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Professor of the Latin Language and Literature.

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Professor of the Greek Language and Literature.

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FELIX ADLER, M. A., Ph. D., New York City.
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ELIAS BARTLEY, B. S.,
Instructor in Chemistry.

ABRAM A. BRENEMAN, B. S.,
Instructor in Chemistry.

JOHN HENRY COMSTOCK, B. S.,
Instructor in Economic Entomology.

CHARLES LEE CRANDALL, B. C. E.,
Instructor in Engineering.

ORVILLE ADELBERT DERBY, M. S.,
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Instructor in Botany.

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WILLIAM R. LAZENBY, AG. B.,
Instructor in Horticulture and Superintendent of the Botanical and General Garden.

B. HERMON SMITH,
Director of the University Press and Instructor in Typography.

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GEORGE BERRY, ARCH. B., *Master of the Chimes.*

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BABCOCK, STEPHEN MOULTON, A. B., Tufts, *Chemistry.*	Ithaca
BERRY, GEORGE, B. Arch., Cornell, *Architecture.*	Afton, Minn.
CADY, NELSON W., Ph. B., Cornell, *Toxicology.*	Indianapolis, Ind.
FOOTE, CHARLES WHITTLESEY, B. A., Western Reserve, *Chemistry.*	Tallmadge, O.
LAW, BENEDICT WILLIS, B. Arch, Cornell, *Architecture.*	Litchfield, Ct.
PITTS, EVA MARIA, B. S., Cornell, *History and Political Science.*	Honeoye
RICE, WILLIAM MORTON JACKSON, B. Arch., Cornell, *Architecture.*	New York City
SCOFIELD, EDSON HAMILTON, B. A., Cornell, *History and Political Science.*	Lansing, Mich.
SHERMAN, BELLE, B. S., Lombard University, *Physiology.*	Philadelphia, Pa.
SMITH, BELLE, B. S. and Lit., Oxford, *Modern Languages and Literature.*	Oxford, O.
SMITH, CLINTON DE WITT, B. S., Cornell, *Engineering.*	Trumansburg
TAYLOR, LOWNDES, B. A., Swathmore, *Mechanic Arts.*	West Chester, Pa.
THOMAS, FLAVEL SHURTLEFF, M. D., Harvard, *Natural History and Comparative Anatomy.*	Hanson, Mass.
TOMPKINS, JOHN HANSELL, B. C. E., Cornell, *Architecture.*	Poughkeepsie
WILES, ROBERT H., B. S., Cornell, *History and Political Science.*	Butler, Mo.
WINSTON, GEORGE TAYLOR, B. Lit., Cornell, *Mathematics and Natural Philosophy.*	Windsor, N. C.

UNDERGRADUATES.

IN THE FOURTH YEAR OR SENIOR STUDIES.

Bates, William Oscar,	Indianapolis, Ind.,	*Philosophy*
Beattie, Arthur Azel,	Salem,	*Mechanic Arts*
Betts, Edward Tatnall,	Wilmington, Del.,	*Chemistry*
Bingham, Henry Jeptha,	Tallmage, O.,	*Architecture*
Bradford, Alice Russell,	Boston, Mass.,	*Science*
Brown, William Raper,	Xenia, O.,	*Architecture*
Bulkley, Almon Wheeler,	West Groton,	*Architecture*
Bunting, Samuel Joseph,	Yardleyville, Pa.,	*Mechanic Arts*
Burt, Charles Franklin,	West Kendall,	*Science*
Carpenter, Samuel Warner,	Cincinnati, O.,	*Philosophy*
Cook, Daniel Barnard,	Deposit,	*Engineering*
Cook, Isaac Newton,	Jersey City, N. J.,	*Engineering*
Corson, Eugene,	Ithaca,	*Natural History*
Davey, Vernon Llewellyn,	Groton,	*Arts*
Dean, Joseph Wright,	Lee's Summit, Mo.,	*Science*
De Wint, John Peter,	Fishkill-on-Hudson,	*Science*
Eddy, Arasca James,	Elmira,	*Science*
Ferguson, Oscar Wood,	New Milford,	*Engineering*
Fitch, George Hamlin,	Ithaca,	*Science*
Gardner, Edward Le Breton,	New York City,	*Mechanic Arts*
George, Edward,	Nassau, N. P.,	*Engineering*
Gillis, Albert Rufus,	Kinsman, O.,	*Mechanic Arts*
Graves, Benjamin Michener,	Richmond, Ind.,	*Science*
Greene, Almon Clayton,	Palmyra,	*Engineering*
Hadley, Hermann McClure,	Brewster Station,	*Architecture*
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Hiscock, Frank Harris,	Syracuse,	*Arts*
Horton, Dudley Returned,	City Island,	*Science*
Howe, Augustus, jr.,	Elizabeth, N. J.,	*Architecture*
Humphrey, Andrew Beaumont,	Columbus, O.,	*Science*
Hutton, Isaac Edgar,	Nanuet,	*Architecture*

Jackson, Edwin,	Wilmington, Del.,	*Science*
King, Charles Cyrus,	Belmont,	*Architecture*
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Ladd, Mary Holman,	Boston, Mass.,	*Arts*
Makepeace, Mervale Dalton,	Pamelia,	*Engineering*
Moler, George Sylvanus,	Buda, Ill.,	*Mechanic Arts*
Newman, Jared Treman,	Ithaca,	*Philosophy*
Nichols, Edward Leamington,	Peekskill,	*Science*
Perkins, Philip Henry,	Kennebunkport, Me.,	*Engineering*
Preston, Erasmus Darwin,	Oak Hill, Pa.,	*Engineering*
Preston, Ebenezer Jewett,	South Dover,	*Science*
Raymond, Charles Ward,	San Francisco, Cal.,	*Engineering*
Roberts, Henry Hurd,	Rock Stream,	*Philosophy*
Rossiter, Ehrick Kensett,	New York City,	*Architecture*
Sackett, Henry Wilber,	Ithaca,	*Arts*
Shaw, Austin Fiske,	Maquoketa, Ia.,	*Science*
Simonds, Frederic William,	Richmond, Ind.,	*Natural History*
Smith, Frank Pierce,	South Granville,	*Science*
Sturges, Willis Merwin,	Mansfield, O.,	*Agriculture*
Tatnall, George,	Wilmington, Del.,	*Engineering*
Thomas, Josephine Julia,	Richmond, Ind.,	*Arts*
Thompson, George Rolandson,	Pleasant Hill, Del.,	*Science*
Thompson, Wibray James,	Chicago, Ill.,	*Science*
Tompkins, Daniel James,	Fulton,	*Philosophy*
Walsh, Vincent Seaman,	Great Bend, Pa.,	*Science*
Wheeler, Frank Pomroy,	Brattleboro, Vt.,	*Science*
Woodford, Frank Dalton,	North Hector,	*Science*
Worthington, John,	Pittsfield, Ill.,	*Arts*

IN THE THIRD YEAR OR JUNIOR STUDIES.

Ashley, James Maceriel,	Toledo, O.,	*Science*
Aylen, Charles Peter,	Aylmer, Can.,	*Engineering*
Ballard, Austin,	Louisville, Ky.,	*Literature*
Barclay, Charles,	Longmont, Col.,	*Science*
Barros, Carlos Paes de,	Sorocaba, Brazil,	*Engineering*
Blend, Stoughton Adelbert,	Addison Hill,	*Agriculture*

Blend, Wellington,	Addison Hill,	*Agriculture*
Berry, William James,	Forestville,	*Arts*
Boardman, George,	Seneca Falls,	*Mechanic Arts*
Brewer, Charles Temple,	Cooperstown,	*Literature*
Brown, James Taylor,	Wappinger's Falls,	*Mechanic Arts*
Bueno, Francisco de Assis Vieira,	S. Paulo, Brazil,	*Engineering*
Cady, Jeremiah Kiersted,	Indianapolis, Ind.,	*Architecture*
Caldwell, Charles Ayer,	Rochester, N. H.,	*Science*
Carpenter, Charles Francis,	Utica,	*Mechanic Arts*
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Dowling, Lawrence,	Bradford,	*Agriculture*
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Francis, Charles Spencer,	Troy,	*Science*
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Hackney, Herbert,	Bay View, Wis.,	*Mechanic Arts*
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Hine, Frank Brooks,	Edon, O.,	*Natural History*
Iams, Franklin Pierce,	Waynesburg, Pa.,	*Arts*
Jarvis, George Milton,	Canastota,	*Engineering*
Jones, Milton Trafton,	Utica,	*Science*
Kaufman, Edward Solomon,	New York City,	*Science*
Kent, Arthur Zenas,	Ithaca,	*Mechanic Arts*
Kent, Walter Henry,	Busti,	*Chemistry*
Knapp, Warren Ezra,	Westmoreland,	*Science*

Lovell, George La Fayette,	Climax, Mich.,	*Science*
Maltby, Albert Elias,	Fayetteville,	*Engineering*
Mandeville, Charles Baker,	Elida, Ill.,	*Science*
McDowell, Willis Gaylord,	Memphis,	*Arts*
McMullen, Justus,	Unionville,	*Engineering*
Messner, John Dagobert,	Springfield, N. J.,	*Science*
Moore, Rachel Leedom,	Wilmington, Del.,	*Science*
Noyes, Fred William,	Dansville,	*Philosophy*
Ostrom, John Nelson,	East Randolph,	*Engineering*
Outerbridge, Franklin,	Hamilton, Bermuda,	*Mechanic Arts*
Palmer, Lelia Belinda,	Ithaca,	*Science*
Parker, William Henry,	Ogdensburg,	*Architecture*
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Pennock, Frederic Moses,	Kennett Square, Pa.,	*Agriculture*
Phillips, Charles Frederic,	Avondale, Pa.,	*Engineering*
Pou, Arthur,	Raleigh, N. C.,	*Engineering*
Prado, Bento de Almeida,	Itú, S. Paulo, Brazil,	*Agriculture*
Rice, Henry Joseph,	Cazenovia,	*Natural History*
Roy, William King,	Wappinger's Falls,	*Chemistry*
Rueppele, Herman Augustus,	St. Louis, Mo.,	*Chemistry*
Russel, Howland,	Ithaca,	*Arts*
Saunders, Charles Fenner,	Westerly, R. I.,	*Architecture*
Seeley, Herman Barker,	Ogdensburg,	*Architecture*
Shackford, James Murray,	Portsmouth, N. H.,	*Mechanic Arts*
Simpson, William Kelley,	Hudson,	*Science*
Sinton, Margaretta Jane,	Ithaca,	*Science*
Smith, Clinton Bloodgood,	Flushing,	*Science*
Smith, Raymond Lee,	Oil City, Pa.,	*Engineering*
Snedecor, James George,	Memphis, Tenn.,	*Arts*
Snell, Alfred Lasher,	St. Johnsville,	*Science*
Straub, Fred Dayton,	Conesus Centre,	*Science*
Stubbs, James Henry,	Framingham, Mass.,	*Engineering*
Sturges, Stephen Perry,	Mansfield, O.,	*Arts*
Sturges, Will Perry,	Mansfield, O.,	*Science*
Sturdevant, James Warner,	Spartansburg, Pa.,	*Science*

Tarleton, John Berry,	Epsom, N. H.,	*Architecture*
Taylor, Frank Everett,	Hinsdale, N. H.,	*Mechanic Arts*
Terry, Herbert,	Fair Haven, Mass.,	*Chemistry*
Thompson, Ellis Dunn,	Bound Brook, N. J.,	*Engineering*
Tilden, Harriet Converse,	Chicago, Ill.,	*Literature*
Urquhart, Colin Keith,	Brooklyn,	*Science*
Van Velzer, Charles Ambrose,	Baldwinsville,	*Science*
Wagner, Edward Augustine,	Pultney,	*Science*
Watts, Millard Fillmore,	Fayette, Mo.,	*Chemistry*
Wheelock, Charles Brackett,	Austin, Texas,	*Engineering*
White, Hamilton Salisbury,	Syracuse,	*Science*
Willmarth, Charles Henry,	Addison, Vt.,	*Agriculture*
Wood, Norma Anna,	Ithaca,	*Science*
Woodruff, Charles Philip,	Conesus Centre,	*Science*
Yatabe, Riokichi,	Japan,	*Science*
Young, Frank Oliver,	Blue Island, Ill.,	*Science*

IN THE SECOND YEAR OR SOPHOMORE STUDIES.

Abell, Walter,	San Francisco, Cal.,	*Engineering*
Adams, William Napoleon,	Ogdensburg,	*Mechanic Arts*
Ames, Willis Chester,	Whitney's Point,	*Engineering*
Aspden, Charles Henry,	Orange, N. J.,	*Engineering*
Aylen, John,	Aylmer, Can.,	*Engineering*
Baker, Eugene,	Ithaca,	*Science*
Balch, Albert Frank,	St. Johnsbury, Vt.,	*Architecture*
Barto, Daniel Otis,	Jacksonville,	*Literature*
Bassett, Emory Newell,	Knoxville, Ill.,	*Engineering*
Beaty, Jenny Bell,	Salem,	*Science*
Bingham, Charles Elbert,	Tallmadge, O.,	*Agriculture*
Bishop, Irving Prescott,	Burlington Flats,	*Literature*
Bolshaw, William Haldom,	Savannah, Ga.,	*Science*
Boynton, William Seward,	St. Johnsbury, Vt.,	*Literature*
Bramhall, William Ely,	Jersey City, N. J.,	*Engineering*
Bray, John Edward,	Danville, Vt.,	*Science*
Brown, Charles Carroll,	Indianapolis, Ind.,	*Engineering*
Bruce, Ida,	New York City,	*Arts*
Carman, Annis Smith,	Ithaca,	*Science*

Carrington, William Theodore,	Toledo, O.,	*Science*
Castro, Thomaz de Aquino e,	Rio de Janeiro, Brazil,	*Engineering*
Clark, Charles Franklin,	Zanesville, O.,	*Natural History*
Clark, Perry,	Forestville,	*Philosophy*
Cobb, Charles Simeon,	Andover,	*Science*
Coon, John Sayler,	Burdett,	*Mechanic Arts*
Cook, Seward Dudley,	Newfield,	*Science*
Craig, Josie,	Canton, Ill.,	*Science*
Crandall, Arthur Fitz James,	Easton,	*Architecture*
Crim, Frank Dwight,	Mohawk,	*Science*
Deming, William Lloyd,	Salem, O.,	*Architecture*
Dennis, Waldo Emerson,	Amanda, O.,	*Science*
Eddy, Minnie Catharine,	Elmira,	*Science*
Eidlitz, Leopold,	New York City,	*Mechanic Arts*
Foster, Henry Ward,	Elmira,	*Arts*
Frota, Antonio Epaminondas de Marie,	Ceará, Brazil,	*Engineering*
Fuller, Lucius Eckstein,	Warren, O.,	*Engineering*
Gage, Simon Henry,	Worcester,	*Natural History*
Gentleman, Willard,	Ottawa, Ill.,	*Science*
Gifford, William Stewart,	Jamestown,	*Science*
Gillett, George Washington,	Villanova,	*Literature*
Grove, Benjamin Hershey,	Buffalo.	*Arts*
Halsey, Frederic Arthur,	Unadilla,	*Mechanic Arts*
Haviland, Merritt Elvin,	Glen's Falls,	*Science*
Hawkins, John Henry Willis,	Binghamton,	*Architecture*
Hill, William Squire,	Rome,	*Literature*
Howard, Leland Ossian,	Ithaca,	*Engineering*
Keith, William,	Warsaw,	*Chemistry*
King, David Woodbury,	Chateaugay Lake,	*Architecture*
Lape, Willard Eugene,	Troy,	*Mechanic Arts*
Lauman, Charles Newcomb,	Burlington, Ia.,	*Literature*
Lee, Richard Henry,	Harlem Springs, O.,	*Engineering*
Leonard, Clarence Levi,	Ithaca,	*Science*
Lima, Custodio Alves,	S. Paulo, Brazil,	*Engineering*
Lindemuth, Arthur Charles,	Greenville, O.,	*Science*
Lockwood, Benjamin Coulson,	Matamoras, O.,	*Engineering*
Loos, Augustus Jacob,	Philadelphia, Pa.,	*Chemistry*

Mann, Louis Morris,	Milwaukee, Wis.,	*Engineering*
Matchett, Edwin Lindsay,	Greenville, O.,	*Arts*
Maxwell, Frank Adams,	Clymer,	*Engineering*
McCormick, Cyrus Hall,	Henderson, Ky.,	*Engineering*
McGill, William Morey,	Pittsburgh, Pa.,	*Science*
McNairy, Amos Bush,	Cleveland, O.,	*Mechanic Arts*
Mead, Theodore Luqueer,	New York City,	*Engineering*
Milford, James Stanley,	New York City,	*Engineering*
Mitchell, Richard Henry,	North Clove,	*Mechanic Arts*
Moore, Frederic Mygatt,	New York City,	*Architecture*
Moraes, Domingos Correa de,	S. Paulo, Brazil,	*Engineering*
Mould, Charles Town,	Utica,	*Architecture*
Munro, Edwin Raymond,	Ogdensburg,	*Engineering*
Myers, Ira Henry,	Nunda Station,	*Science*
O'Niel, Everett,	Savannah,	*Science*
Osterman, Godfrey,	Canastota,	*Engineering*
Palmer, Edward Herendeen,	Rochester,	*Philosophy*
Palmer, Minerva,	Rochester,	*Literature*
Patrick, Frank,	Philadelphia, Pa.,	*Philosophy*
Peck, Theodore Barnard,	Bristol, C.,	*Architecture*
Phillips, George Henry,	Newark, N. J.,	*Mechanic Arts*
Reilly, William James,	Erie, Pa.,	*Engineering*
Rice, Dwight Carlton,	Hamilton,	*Engineering*
Sanford, Ferdinand Van Derveer,	Warwick,	*Science*
Schureman, Charles Henry,	St. Louis, Mo.,	*Science*
Schwerdtfeger, Emil,	New York City,	*Literature*
Sherman, Elroy Delos,	Cleveland, O.,	*Science*
Sherman, Walter Justin,	Norwalk, O.,	*Engineering*
Silveira, José Luiz Monteiro de,	Rio de Janeiro, Brazil,	*Engineering*
Simons, Frank Edgar,	Fulton,	*Science*
Sinton, William Kelly,	Ithaca,	*Science*
Slocum, Samuel Gifford,	Evan's Mills,	*Architecture*
Smith, Eugene Raymond,	Islip,	*Engineering*
Stevens, George Barker,	Spencer,	*Arts*
Stevenson, John Chiles Houston,	St. Louis, Mo.,	*Philosophy*
Stout, Annabel,	Farmer Village,	*Science*
Sturges, John Eliot,	Mansfield, O.,	*Arts*

Sutherland, William Howard,	La Porte, Ind.,	*Science*
Tejada, Miguel Lerdo de,	Mexico, Mex.,	*Engineering*
Thatcher, Cornelius Stephen,	Hopewell,	*Engineering*
Thomas, Howard,	Stowe, Vt.,	*Engineering*
Tibbets, Addison Sebry,	Belfast,	*Engineering*
Van Dusen, Edith May,	Geneva,	*Literature*
Van Houten, Chauncey,	Ithaca,	*Mechanic Arts*
Van Pelt, Evert,	Williamsville,	*Engineering*
Van Vleet, De Forest,	Candor,	*Science*
Viegas-Munis, Joaquim,	Piracicaba, Brazil,	*Engineering*
Ware, Lyman Eugene,	Wrentham, Mass.,	*Mechanic Arts*
Wason, Charles William,	East Cleveland, O.,	*Mechanic Arts*
Waterman, John Sayles,	Cumberland Hill, R. I.,	*Mechanic Arts*
Watson, John Edward,	Pulaski,	*Engineering*
Watson, James Hillman,	Ayr, Can.,	*Engineering*
Weeks, Frank Peters,	Pittsburg, Pa.,	*Natural History*
Wilson, Charles Forsyth,	Ithaca,	*Philosophy*

IN THE FIRST YEAR OR FRESHMAN STUDIES.

Abrams, Alva Elnathan,	Schenectady,	*Science*
Albertson, Jonathan White,	Hertford, N. C.,	*Engineering*
Ames, Charles Wilberforce,	Germantown, Pa.,	*Literature*
Babcock, John Wesley,	Jamestown,	*Arts*
Ballard, Alfred Hovey,	Syracuse,	*Science*
Ballard, Leda Amanda,	Appleton, Wis.,	*——
Ballard, Samuel Thruston,	Louisville, Ky.,	*Science*
Barnes, Fannie Bates,	Pawtucket, R. I.,	*Science*
Bartlett, Eugene Moe,	Warsaw,	*Science*
Bauer, William Christopher,	Elizabeth, N. J.,	*Agriculture*
Beahan, Willard,	Watkins,	*Engineering*
Beardsley, Arthur Eugene,	Cayuga, Ill.,	*Natural History*
Beck, Charles Warner,	Englewood, Ill.,	——
Benchley, Paul Zeno,	Ithaca,	*Agricultnre*
Biggs, Chauncy Pratt,	Trumansburg,	*Science*
Bissell, Frank Edward,	South Bend, Ind.,	*Engineering*
Boardman, George Edgar,	Syracuse,	*Arts*

* The dash denotes that a student has recently entered the University, but has not yet entered upon any one of the Regular Courses of Study marked out in the REGISTER.

Boden, Jabez Monk,	Greenwood Iron Works,	*Mechanic Arts*
Bonney, Alfred,	New York city,	*Agriculture*
Borden, James McKee,	Washington, D. C.,	*Mechanic Arts*
Borden, John,	Chicago, Ill.,	*Science*
Borden, Thomas Paschal,	Denver, Col.,	*Engineering*
Brown, Andrew Wallace,	Newark, N. J.,	*Architecture*
Brown, Charles Gardner,	Plymouth,	———
Bruen, Frank,	Dayton, O.,	*Engineering*
Burford, James Shadrack,	Burfordville, Mo.,	*Engineering*
Cady, Daniel Wayland,	Peterborough,	*Arts*
Carey, Eugene,	Dunkirk,	*Science*
Carrington, Fred Boyd,	Fulton,	*Architecture*
Carter, William Wallace,	Jacksonville, Ill.,	*Literature*
Chambard, Louis,	Fayette, O.,	*Engineering*
Chapman, Robert Burns,	Syracuse,	*Mechanic Arts*
Chermont, Theodosio Lacerda,	Pará, Brazil,	*Engineering*
Church, Frederick William,	Aylmer, Canada,	*Chemistry*
Clary, Walter Ware,	Syracuse,	*Literature*
Cole, Willoughby,	San Francisco, Cal.,	*Science*
Conant, Heywood,	Wilmington, Del.,	*Science*
Cook, William Ellison,	Chillicothe, O.,	*Agriculture*
Cooper, Charles Marion,	Indianapolis, Ind.,	*Science*
Cooper, Louis Napoleon,	Crockett, Tex.,	———
Crandall, Clayton,	Ithaca,	*Science*
Culver, Wilmer Horace,	Bay City, Mich.,	*Mechanic Arts*
Curtis, John Milton,	Denver, Col.,	*Science*
Darch, John,	Stafford,	*Engineering*
Davidson, Charles Parker,	Waverly, Pa.,	*Agriculture*
Davis, Delamore Leon,	Salem, O.,	———
Dawson, Frank Raglan,	Christiansted, St. Croix,	*Science*
Detwiler, George Knabb	Toledo, O.,	*Architecture*
Dewey, Lola,	Columbus, Pa.,	*Natural History*
De Witt, Bessie Bell,	Owego,	*Arts*
Dickson, Gilbert John,	Brushland,	*Science*
Dunning, Edgar Francis,	New York city,	*Engineering*
Eaton, George Penton,	Oxford,	*Science*
Edwards, William Seymour,	Coalburg, W. Va.,	*Engineering*

Ellis, Edwin Murrie,	Vineland, N. J.,	*Science*
Ely, William Caryl,	East Warsaw,	*Science*
Everson, Charles Brown,	Syracuse,	*Engineering*
Finch, Robert Brooks,	Ithaca,	*Literature*
Fleming George Claudius,	Ithaca,	*Arts*
Ford, John Howard,	New York City,	———
Galigher, Frank Lippitt,	Cairo, Ill.,	———
Gardiner, William Lebbeus,	Norwalk, O.,	———
Genung, Richard Beers,	Ithaca,	*Science*
Giddings, Lizzie Jane,	Jefferson, O.,	*Science*
Gillett, Henry Taft,	Villenova,	*Literature*
Grant, Jesse Root,	Washington, D. C.,	*Engineering*
Grave, Vernon De Loss,	Richmond, Ind.,	*Science*
Green, Edward,	Utica,	*Mechanic Arts*
Green, Robert Packer,	Media, Pa.,	*Engineering*
Hadley, Floyd Joseph,	Westville Centre,	*Literature*
Hale, Frederic Albert,	Rochester,	*Architecture*
Haley, William,	Honesdale, Pa.,	*Science*
Hallett, James Clay,	Pompey,	*Arts*
Hawkins, William Beardsley,	Fairport,	*Science*
Heermans, Forbes,	Syracuse,	*Mechanic Arts*
Heublin, Louis Frederick,	Hartford, Ct.,	*Science*
Higgs, John Broad,	Somerset,	*Science*
Hill, John Thomas,	Warren, Pa.,	*Mechanic Arts*
Hixson, Joseph Foster,	Ithaca,	*Engineering*
Hurst, James Henry,	Tribe's Hill,	*Science*
Ingraham, William Shurtleff,	Bristol, Ct.,	*Mechanic Arts*
Jackson, Lora Coates,	Wilmington, Del.,	*Science*
Johnson, Ben,	Ithaca,	*Mechanic Arts*
Johnson, Jacob,	Pittsford,	*Agriculture*
Jones, Hiram Thomas,	Rochester,	*Agriculture*
Jones, Horace Tuttle,	Ovid,	*Chemistry*
Jones, John Lambert,	Flemington, N. J.,	*Literatnre*
Jones, Lisette Frances,	Ilion,	*Science*
Jordão, Benvenuto,	S. Paulo, Brazil,	*Mechanic Arts*
Jordão, José Nabor Pacheco,	Rio Claro, Brazil,	*Engineering*
Kendall, Franklin Mason,	Attica,	*Science*

Lente, William Kemble,	Cold Spring,	*Science*
Lewis, John,	Ithaca,	*Science*
Macomber, Lila,	Carthage,	*Science*
Macpherson, David Joseph,	Bay City, Mich.,	*Engineering*
Mahoney, John James,	Albany,	*Science*
Mann, Frank Weston,	Norfolk, Mass.,	*Science*
Manning, Charles Edward,	Factoryville,	*Engineering*
Martin, Luther,	Williamstown, Vt.,	———
McIntire, George Alexander,	New York City,	*Mechanic Arts*
McKay, William Lincoln,	Elmira,	*Arts*
McLaury, Charles Dayton,	Milford,	———
M'Millan, Albert Smith,	Waverly, Ia.,	*Science*
Merrill, Thomas Davis,	Saginaw City, Mich.,	*Engineering*
Mitchell, Frances Henrietta,	Philadelphia, Pa.,	*Literature*
Moore, Thomas Ramon,	Santa Barbara, Cal.,	*Mechanic Arts*
Morse, Edward Andrews,	Dixon, Ill.,	*Science*
Nichols, Arthur,	Athens,	*Mechanic Arts*
O'Brien, William Frank,	Halifax, N. S.,	*Engineering*
Oettiker, James,	Belmont, Wis.,	*Science*
Oliver, Mary Ellen,	Linn, Mass.,	*Philosophy*
Otis, Philip Arthur,	Leeds, Mass.,	*Mechanic Arts*
Page, John,	Stafford,	*Engineering*
Palmer, Lynde,	Plattsburgh,	*Science*
Patrick, Charles,	New Philadelphia, O.,	———
Pattin, William Bernice,	Fort Plain,	*Literature*
Pickett, William Passmore,	Litchfield, Ct.,	*Science*
Pitcher, Mary Merrill,	Owego,	*Arts*
Preston, Arvella,	Wilmington, Del.,	*Literature*
Putnam, Ruth,	New York City,	*Literature*
Raun, Edward Phelps,	Ithaca,	*Mechanic Arts*
Reed, Frederic Clinton,	Bath, Me.,	*Science*
Rexford, Charles Myron,	Watertown,	*Arts*
Richardson, Jeremiah Albert,	New York city,	*Architecture*
Ribeiro, Quintiliano Nery,	Minos-Geraes, Brazil,	*Architecture*
Rodriguez, Francisco Valdes,	Havana, Cuba,	*Engineering*
Roth, John Christian,	Albany,	*Chemistry*
Russel, Edward,	Ithaca,	*Arts*

Savage, John,	Bay City, Mich.,	*Chemistry*
Seaman, William Kelly,	Newburgh,	*Mechanic Arts*
Shaffer, Cicero,	Newfield,	*Science*
Shaw, Frederic Lander,	Dixon, Ill.,	*Science*
Shearer, James Buchanan,	Bay City, Mich.,	*Science*
Sibley, Edwin Henry,	Franklin, Pa.,	*Science*
Simons, Frank Edgar,	Fulton,	*Science*
Smith, Albert William,	Westmoreland,	*Mechanic Arts*
Smith, Edwin,	Franklin, Pa.,	*Mechanic Arts*
Smith, Samuel McKee,	Winfield,	*Literature*
Smith, William Judson,	Syracuse,	*Science*
Stevens, Henry Lee,	Montfort, Wis.,	*Natural History*
Sturges, Harold,	Geneva Lake, Wis.,	*Architecture*
Sutton, William John,	Walkerton, Can.,	*Mechanic Arts*
Tarbox, Paul Walter,	Hamilton, Can.,	*Engineering*
Thompson, Phineas Herd,	Turners,	*Engineering*
Thornburg, Frank,	Clinton, Ia.,	*Science*
Throop, William Bryant,	Hamilton,	*Engineering*
Tibirica, José Piratininza,	S. Paulo, Brazil,	*Mechanic Arts*
Tiffany, Charles Otis,	Coxsackie,	*Agriculture*
Tiffany, Joseph Burr,	Coxsackie,	*Agriculture*
Towne, Robert Safford,	Portsmouth, O.,	———
Treman, Robert Henry,	Ithaca,	*Mechanic Arts*
Turner, Henry Ward,	Vineland, N. J.,	*Natural History*
Van Norman, Harvey Justin,	Jasper,	*Science*
Van Valkenburg, Willis,	Ithaca,	*Natural History*
Vasconcelles, Augusto Cezar de,	Rio de Janeiro, Brazil,	*Mechanic Arts*
Verguiero, Alberto Pereiro Campos,	Santos, Brazil,	*Engineering*
Volkman, Arthur Ludwig Karl,	New York City,	*Architecture*
Wakeley, Arhtur Cooper,	Omaha, Neb.,	*Literature*
Wakeley, Bird Chapman,	Omaha, Neb.,	*Literature*
Weed, Addison,	Rose,	*Science*
Weed, Watson,	Clyde,	*Science*
Welker, Philip Albert,	Toledo,	*Engineering*
Wilcox, Wallace Jay,	Ithaca,	*Mechanic Arts*
Winans, Henry Darius,	Ithaca,	*Science*
Woodward, Julius Hayden,	Brandon, Vt.,	———
Youngs, Frank Howell,	Bridgehampton,	*Science*

STUDENTS IN SPECIAL SUBJECTS.

Babcock, Edward Clarence,	Monmouth, Ill.,	*Mechanic Arts*
Bingham, Forrest Edward,	Santa Barbara, Cal.,	*Mechanic Arts*
Botsford, Anna,	Otto,	*Mod. Languages and Literature*
Breed, William Bradly.	Phœnix,	*Chemistry*
Brown, Goodwin Nathaniel,	Mexico,	*Mechanic Arts*
Brownlee, James Corson,	W. Alexander, W. Va.,	*Nat. Hist. and Chem.*
Carpenter, Harris Irving,	Milford, Mass.,	*Mechanic Arts*
Claxton, William Neely,	Pineville, Pa.,	*Chemistry*
Demorest, Henry Clay,	New York City,	*Hist. and Polit. Sci.*
Field, Edward Loyal,	Galesburg, Ill.,	*Mechanic Arts*
Garver, Madison Monroe,	Pecatonica, Ill.,	*Physics*
Gurley, William,	Danville, Ill.,	*Geology*
Halsey, William Gorden,	New York City,	*Mechanic Arts*
Hurlbut, De Loss,	Genoa,	*Nat. Hist. and Chemistry*
Jarvis, James Lorenzo,	Canastota,	*Natural History*
Jipson, Webster Charles,	Blissfield, Mich.,	*Architecture*
King, George Wars,	Chateaugay Lake,	*Nat. Hist. and Chem.*
Kingsbury, Joseph Thomas,	Salt Lake City,	*Chemistry and Physics*
Lawson, Sam Glenwood,	Jersey City, N. J.,	*Chemistry*
Leal, Malcolm,	Cortland,	*Chemistry*
Loos, George William,	Philadelphia, Pa.,	*Mechanic Arts*
Mello-Souza, Pedro de,	S. Paulo, Brazil,	*Engineering*
McCrea, Clark Waldo,	Eagle Rock, Pa.,	*Engineering*
Monroe, James Smith,	West Milford, N. J.,	*Mechanic Arts*
Morgan, Edwin Jay,	Ithaca,	*Natural History*
Odson, Edgar,	Springwater, Ia.,	*North European Languages*
Phillips, Franklin,	Newark, N. J.,	*Mechanic Arts*
Preston, Ida,	South Dover,	*Botany and Modern Languages*
Randall, Winthrop,	Ithaca.	*Chemistry*
Roberts, Milton Josiah,	Ithaca,	*Natural History*
Sands, Franklin Moses,	Stanfordville,	*Engineering*
Wheeler, Olin Dunbar,	Warren, O.,	*Surveying and Draught'g*
Warner, Jacob Henry.	Central Bridge,	*Agr. and Vet. Science*

OPTIONAL STUDENTS.

Aguiar João Déos,	S. Paulo, Brazil
Aldrich, David Sands,	Palmyra
Andrew, Frederic George,	La Porte, Ind.
Barnard, Philip,	Lake View, Ill.,
Bingham, Homer William,	Monroe, Wis
Boardman, Curtis,	Trumansburg
Borst, Henry Vroman,	Cobleskill
Boylan, Winfield Scott,	Nunda
Buffum, Frank Edward,	Pittsburgh, Pa.
Camp, James Leeworthy,	Dixon, Ill.
Chantler, Thomas Drummond,	Alleghany City, Pa.
Cobb, Horace Hamilton,	Andover
Folsom, Emerson,	Zanesville, O.
Gardner, James William,	Toledo, O.
Glean, James Augustus,	Sagua la Grande, Cuba
Hawn, Laurens,	Leavenworth, Kan.
Hamer, Arthur Percival,	Huntingdon, W. Va.
Hayes, Webb Cook,	Fremont, O.
Hoge, Solomon Fisher,	Jefferson, Pa.
Jonas, Albert Henry C. S.,	Buffalo
Jordan, Mary Eudora,	Gainsville
Kerr, William Ogden,	Greenville, O.
Lake, Edgar Henry,	Cooperstown
Looney, Francis,	Buffalo
Mann, Frederick Marcus,	Milwaukie, Wis.
Martin, Charles Byron,	Tifflin, O.
Marvin, Charles Edson,	Walton
Murray, Thomas Archibald,	Calumet, Ill.
Nash, Hermon Woodworth,	Ithaca
North, James Dayton,	New York city
Perry, Lewis,	St. Louis, Mo.
Phillips, Edward Linden,	Newark, N. J.
Pitts, John Dayton,	Mt. Calm, Tex.
Queiroz-Telles, Antonio neto,	S. Paulo, Brazil
Riddell, Robert Brown,	New Orleans, La.
Sherman, Meritt Masters,	Salem

Sherman, Walter Rothschild,	Washington, D. C.
Thompson, John Fremont,	Candor
Trumbull, Mary,	Sandy Hill
Wassell, Samuel Spotts,	Little Rock, Ark.
Waldo, Genevieve,	Scotland, Ct.
Walker, George Harold,	Cleveland, O.
Wells, Edward Hyde,	Utica
White, Abbie Mowry,	Farnumville, Mass
Wilcox, David James,	Leon
Willett, Docia,	Gowanda
Wingate, Henry Anderson,	Louisville, Ky.
Wright, Edgar Douglas,	Danby

SUMMARY BY COURSES.

Science	138
Literature	26
Philosophy	12
Arts	33
Agriculture	17
Architecture	30
Chemistry	13
Engineering	91
Mechanic Arts	49
Natural History	13
Undetermined	13
In Special Studies	33
Optional Students	48
Resident Graduates	16
Total,	532

SUMMARY BY YEARS.

In Post Graduate Courses	16
In Fourth Year or Senior Studies	63
In Third Year or Junior Studies	96
In Second Year or Sophomore Studies	110
In First Year or Freshman Studies	166
In Special Courses	33
In Optional Studies	48
Total,	532

General View of The University.

FOUNDATION.

THE existence of The Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell. On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge for tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts. amounting to several hundred thousand dollars.

CHARTER.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation"

and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress, for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based. In commemoration of the passage of the Act of Incorporation, the University keeps the anniversary of its final signature by the Governor of the State—the twenty-seventh of April—as a holiday under the title of "Charter Day."

HISTORY.

In accordance with the requirements of its Charter, the Institution was duly opened on the seventh of October, 1868. The number of professors actually present at that time was fifteen; of assistant professors three; and the number of non-resident professors, who had signified the acceptance of their chairs, was six. This made a total of twenty-four instructors. At the entrance examinations three hundred and twelve students and about one hundred more during the year were admitted. Only two completed buildings were then at the disposal of the University. The construction of the roads and bridges on the University estate had hardly been commenced. The library, collections and laboratories were not arranged. The career of the Institution since that period has been one of constant advancement. The interest of the public, gratified at seeing established in the State of New York an institution for advanced instruction which promised to take and maintain a high rank, has never ceased to manifest itself. Gifts of various kinds—collections, sums for building purposes, machinery and models—have been freely bestowed upon the University. The value of these gifts is estimated at over one million dollars. At the end of the academic year 1868-69, nine persons were graduated; at the close of 1869-70, twenty-four; at the close of 1870-71, forty; at the close of 1871-72, sixty-seven; at the close of 1872-73, ninety-five; at the Commencement, 1873-74, sixty-three; making in all two hundred and ninety-eight on the list of Alumni.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868-69—provides for the support and maintenance of colleges, "where," in the language of the act, "the leading object shall be, without excluding other scientific studies, and includ-

ing military tactics, to teach such branches as are related to agriculture and the mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated. How far this has been done may be seen by reference to subsequent pages, and especially to those devoted to Agriculture, the Mechanic Arts, and Military Science.

THE UNIVERSITY AND THE STATE.

The University owes a large portion of its endowment to the considerate bounty of the State, of whose highest civic officers four are, by virtue of their position, Trustees of the Institution; and the Legislature has, in various acts, shown an enlightened regard for its interests. The University is bound by the terms of the act which created it, to educate, free of all fees for instruction, one student from each of the Assembly Districts of the State; and its Trustees in deciding that this exemption from payment of the usual dues shall continue, in the case of each student, for four years, have given the most liberal construction to this obligation.

STATE STUDENTS.

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students. The following is the complete text of the paragraph alluded to, as amended May 13, 1872:—

§ 9. The several departments of study in the said University shall be open to applicants for admission thereto at the lowest rates of expense consistent with its welfare and efficiency, and without distinction as to rank, class, previous occupation or locality. But, with a view to equalize its advantages to all parts of the State, the Institution shall annually receive students, one from each Assembly District in the State, to be selected as hereinafter provided, and shall give them instruction in any or in all the prescribed branches of study in any department of the said Institution, free of any tuition fee, or of any incidental charges, to be paid to said University, unless such incidental charges shall have been made to compensate for damages needlessly or purposely done by the students to the property of said University. The said free instruction shall moreover be accorded to said students in consideration of their superior ability, and as a reward for superior scholarship in the academies and public schools of this State. Said students shall be selected as the Legislature may from time to time direct, and until otherwise ordered, as follows:—The school commissioner or commissioners of each county, and the board of education of each city, or those performing the duties of

such a board, shall select, annually, the best scholar from each academy and each public school of their respective counties or cities as candidates for the University scholarship. But in no case shall any person having already entered the University be admitted as one of such candidates. The candidates thus selected in each county or city shall meet at such place and time in the year as the school commissioner or commissioners of the county, and the said boards of education of the cities in those counties which contain cities, shall appoint; and the school commissioner or commissioners, and the said board of education, or such of them as shall attend and act, shall proceed to examine said candidates and determine which of them are the best scholars; and they shall then select therefrom to the number of one from each Assembly District in said county or city, and furnish the candidates thus selected with a certificate of such selection, which certificate shall entitle said student to admission to said University, subject to the examination and approval of the Faculty of said University. In making these selections, preference shall be given (where other qualifications are equal) to the sons of those who have died in the military and naval service of the United States; consideration shall be had also to the physical ability of the candidate. Whenever any student selected, as above described, shall have been, from any cause, removed from the University before the expiration of the time for which he was selected, one of the competitors to his place in the University from his district may be selected to succeed him therein, as the school commissioner or commissioners of the county of his residence, or the board of education of the city of his residence, may direct.

As the regular fee for tuition is twenty dollars per term, or sixty dollars per year, the money value of every free scholarship to the successful competitor is two hundred and forty dollars.

The Trustees of the University have also placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four from each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of thirty thousand seven hundred and twenty dollars *per annum*.

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Special Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, History, etc.; or he may, subject to the approval of the Faculty, take an *Optional Course*, under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to

Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York.

It will be seen by the amended law, that the intervention and sanction of the Boards of Supervisors—formerly found so cumbersome—are now entirely done away with, the whole matter being placed in the hands of the School Commissioners and Boards of Education.

It will also be observed that no student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which sometimes occurred under the old law,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

It will also be noticed that the provision of the original law, by which the successful candidate is subject to the usual entrance examination on arriving at the University, is retained. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

In the interest of the progress and spread of education in this State, the Trustees respectfully ask the earnest coöperation of School Commissioners and Boards of Education in their efforts to make this system effective; to see that, by wide-spread notice beforehand among the schools, the purpose of the competition be thoroughly understood; that, by proper advertisement, the time and place of the competition be made known to as many scholars as possible, and that the examination be made so thorough that the successful candidates will be a credit to the University and to the school system of the State.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to con-

sult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-four. Of these, one is the Founder, who, in accordance with the provisions of the Charter, is a Trustee for life. Another is the eldest son of the Founder, who, by the same authority, is a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, holds frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings, a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the super-

vision of the various courses of study, and such duties as generally appertain to an academic senate. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties; and Special Courses, leading to degrees, have been prescribed in six different Departments.

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient and Asiatic Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History.

TERMS AND VACATIONS.

The Academic Year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Monday following the tenth day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring Recess, consisting of only three academic days, begins at noon of the Friday next after the twenty-second day of March.

The Spring Term begins on the Tuesday next after the twenty-second day of March, and the instruction for the term begins on the Thursday following, and continues until Commencement, making in all thirty-seven weeks of term time in the academic year.

For the beginning and ending of terms and vacations, and other matters of detail relating to them, for the year 1874–75, see the Calendar, p. 9 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince great misapprehension in regard to its plan and organization. This has rendered necessary the subjoined statements:—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactorily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students of any State or country.* Free instruction for undergraduates, is given only to State Students and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York. But all others are received, whatever may be the State or country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows:—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers*, some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

3. *The prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

5. *The unsectarian character of the Institution.* The University seeks, as its highest aim, to promote Christian civilization. But as it was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view, it would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the Charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

RELIGIOUS INSTRUCTION.

A University Chapel—the gift of Henry W. Sage—has been completed during the past academic year, in which religious services will be held, in in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. There are, also, daily chapel services, to which students are invited; although none are compelled to attend.

HIGHER EDUCATION OF WOMEN.

By an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be eighteen years old. A separate building—the Sage College for Women—is in progress, and will be completed and in readiness for use by the autumn of 1875. The object of this movement is to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through Academy, College, etc., up to the fullest development of Educational resources in a well endowed and completely equipped University, with its technical departments for the useful Arts and its professional schools, for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its Professors, are placed at the service of its own graduates, and of the graduates of like standing from other Colleges and Universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they may have occasion to use in the prosecution of their studies and investigations. Al-

ready quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been amply provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate special Faculty.

SELF-SUPPORT BY STUDENTS.

It was determined at the outset to ascertain, by fair experiment and on a considerable scale, how far it was possible for a student, by means of manual and other labor, to pay a portion of the expenses of an advanced education. In accordance, therefore, with the system proposed in the original "Report on Organization," many students have engaged in various kinds of work. The results have shown that young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and a few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. There are always some extra expenses, at the outset, attendant upon settling down in new quarters and making provisions for a course of study. In no case is self-support, to any extent, an easy task. It requires energy, persistence and sacrifice; and even a skillful mechanic ought to have some means in reserve, so that his energies in the University will not be too much diverted from mental to manual labor. It must be distinctly understood that the University does not *guarantee employment to any student.* The larger part of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work; but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. It ought, moreover, to be here stated that the number of young men applying for such labor has constantly exceeded the number that the University is able to employ. At

this time, therefore, the University authorities cannot recommend any young man to come to the Institution, relying entirely on unskilled labor for support. Some few have that peculiar combination of mental and physical strength which is required to support themselves entirely,—the majority have not.

THE UNIVERSITY TOWN.

Ithaca, the seat of the University, is a town of about ten thousand inhabitants, situated at the head of Cayuga Lake, in Tompkins County, New York. It is accessible from the East, South and West by means of the Erie Railway, leaving that road either at Owego, thence to Ithaca by the Ithaca branch of the Delaware and Lackawanna Railway, or at Waverly, from which place the Ithaca and Athens Railroad leads to Ithaca; or passengers can leave at Elmira, and come directly to Ithaca. From the North there are three roads that leave the New York Central (Auburn Branch), one at Geneva, one at Cayuga Bridge, and the third is the Southern Central, which leaves at Auburn, and crosses the Ithaca and Cortland Road at Freeville. The Ithaca and Cortland Railroad starts from the immediate vicinity of the University buildings, and connects with the Southern Central Railroad at Freeville, a distance of nine miles, and with the Syracuse and Binghamton Railroad at Cortland, a distance of twenty miles from Ithaca; in the former case reaching the New York Central Railroad at Auburn, and in the latter at Syracuse.

Scope of Instruction.

I. GENERAL COURSES.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words:—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

Accordingly the Faculty, under the instructions of the Trustees, have marked out both General and Special Courses, as follows:—

1. THE COURSE IN ARTS.

The Course in Arts, leading to the degree of BACHELOR OF ARTS, extends through four years. It includes the Greek and Latin languages, and is similar to the usual academic course in the other colleges and universities of this country. During the first year no option is allowed in the choice of studies. In the second year everything is optional except Greek, Latin, and the exercises in Elocution and Rhetoric. During the third and fourth years everything is optional except the studies in the Departments of Philosophy and Letters. During the first and second years Latin and Greek are required four times a week each; and after that they may be pursued through the two remaining years so as to occupy twelve out of the fifteen hours of recitation per week.

2. THE COURSE IN LITERATURE.

The Course in Literature, leading to the degree of BACHELOR OF LITERATURE, extends through four years. It differs from the Course in Arts in requiring no Greek, and is characterized by a larger amount of attention to the Modern Languages and English Literature. Latin is required during the first year of the Course. In the second year, German is required to the extent of one recitation a day. French is also required throughout two terms of the year. After the first year Latin is optional during the Course; and after the second, German, French and other Modern Languages may be pursued continuously to the end of the Course. After the end of the second year, students in this Course are allowed, at the beginning of each year, to substitute for the studies prescribed in the Course, other studies in the Departments of Languages and Letters; the substitution, however, must be approved by the Faculty, and no change in the Course thus arranged can be made during the year.

Arrangements are in progress to give a course of instruction in journalism, comprehending lectures on the history of newspapers and periodicals and on the details of their management, together with practical teaching in phonography, typography and telegraphy.

3. THE COURSE IN SCIENCE.

The Course in Science, leading to the degree of BACHELOR OF SCIENCE, extends through four years, and includes five hours a week, during the last year, devoted to some one science as a specialty. Its peculiar features are the study of Mathematics; of the French and German languages; and of the historical, physical, moral and political sciences. After the completion of the studies of the first and second years, however, the student is allowed, under certain limitations, an option by which he can substitute sciences from the Special Courses for those that are named in the General Course. This liberty is believed to give the student as wide a range for choice as is consistent with the varied and general culture for which the Course was designed.

4. THE COURSE IN PHILOSOPHY.

This is designed to be a scientific course of a higher grade than the preceding. By requiring Latin for admission, the same as in the Courses in Arts and Literature, the student is able to acquire the requisite amount of French and German in a much shorter time. His knowledge of Latin,

with the mental training gained in acquiring it, is also found to be such a help in comprehending the technical terms and peculiar phraseology of most of the sciences, that he is able to do much more towards a mastery of the broad field of literature, science and history in a course of four years, than he could hope to do without such a preparation. Accordingly provision is made for this higher attainment; and during the third and fourth years of the Course especially, there is more opportunity for optional study than in the Course in Science.

II.. OPTIONAL COURSES.

Optional Courses are those which the student may select for himself; and in no Course is it necessary, for the attainment of a degree, that the studies should be followed exactly in the prescribed order; and in the General Courses equivalents will be accepted, in some cases, for the studies indicated, provided they are of the same general character.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which results from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to the inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

Undergraduates are also permitted, upon proper application to the Faculty, at the beginning of any term, to transfer themselves from one of the General Courses to an Optional Course, or, with the consent of the Faculty concerned, to any Special Course. All the Courses have been arranged upon a basis of three lectures or class exercises a day, thus occupying fifteen hours a week; but students who find themselves able to accomplish more than this are allowed to take additional studies. And so too, students who are obliged to labor as a means of self-support are sometimes, upon sufficient reasons shown to the Faculty, excused from attendance upon the full standard number of University exercises. This, however, does not obviate the necessity of completing the entire Course before graduating.

III. SPECIAL COURSES.

The Special Courses differ from the General Courses, not only in the studies which they include, but also in the important fact that while the General Courses have chiefly in view the culture of the mind, the Special Courses aim rather to fit students more immediately for some one of the departments of productive industry.

1. AGRICULTURE.

The lectures and exercises in this Course comprise the following subjects: 1. The *Chemistry of Agriculture*, including the constituents and chemical agencies of the atmosphere and of water, and the composition of manures. 2. The *Geology of Agriculture*, including the formation of soils, their chemical, physical and economic character, their suitability to different kinds of crops, and the principal geological features of the various portions of the United States as affecting the soils and productions. 3. The *Physics of Agriculture*, including meteorology, or the laws of climate, and of light and heat as influencing plant life. 4. The *Mechanics of Agriculture*, and their application to the various descriptions of implements and labor required on the farm. 5. The *Botany of Agriculture*, including structural botany, vegetable physiology, vegetable pathology, and a knowledge of crops cultivated for food and for technical purposes. 6. The *Zoölogy of Agriculture*, including the habits, diseases and treatment of live stock, the anatomy of the horse, the cow, the sheep, and other farm animals, and all branches of veterinary surgery and medicine, as well as a special consideration of insects injurious to vegetation. 7. The *Economics of Agriculture*, including the sequence of agricultural operations, the economical division of labor, rearing, feeding and handling of domestic animals, the rotation of crops, the improvement of the soil by manuring, draining and liming, farm engineering and construction, general agricultural policy, and the management of landed property.

Two courses of study are marked out, one of which requires four years for its completion, and leads to the degree of BACHELOR OF AGRICULTURE; the other is an abridged course of three years, comprising all the purely agricultural instruction given in the full course. It is recommended to all who enter the school to take one of these courses of study; but students who have a limited amount of time at their disposal, are at liberty, as in other departments of the University, to select and follow any studies from these courses that they may be qualified to pursue with advantage, provided only that the full number of fifteen recitations per week,

or its equivalent, is made up; or, if any person should wish to attend only a partial course of one or more series of lectures, and at the same time to work in the laboratories, or gardens, or on the farm, under the direction of the respective professors in charge, he will be permitted to do so at the discretion of the Faculty. Of such a student it will be required that his time be as fully occupied in study and work as that of other students.

In practical agriculture five hours weekly during the senior year are devoted to technical instruction, this time being divided between lectures, reviews, agricultural calculations and farm accounts; besides which, the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make the student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the class-room exercises, the student devotes as much time as can be profitably spared for the purpose to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

In veterinary science an opportunity is afforded to students who desire it, to pursue the study of veterinary medicine and surgery farther than is provided for in the regular courses of study of the school.

Students in any department in the school of agriculture enjoy, in common with all members of the University, the privilege of using the University library, and of attending any lectures given in the University.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas' "American Fruit Culturist;" Kent's "Landscape Gardening;" Chauveau's "Comparative Anatomy of the Domestic Animals;" Gamgee's "Domestic Animals in Health and Disease;" Marshall's "Outlines of Physiology."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Ander-

son's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius' "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening;" Bouley and Reynal's "Dictionaire de Médecine Vétérinaire;" Percivall's "Hippopathology;" Low's "Domestic Animals;" Stewart's "Stable Economy;" Dobson "On the Ox;" Leyh's "Handbuch der Anatomie der Hausthiere;" Colin's "Physiologie des Animaux Domestiques;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Hering's "Operationslehre;" Stephen and Seller's "Physiology at the Farm;" Goodale's "Breeding."

The simple requirements for admission to this School put the advantages which it offers within the reach of any enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in the School of Agriculture before any others who may wish for this work.

Tuition is *free of charge*. Room-rent may be remitted, at the discretion of the Faculty, provided the student is at the same time doing a reasonable amount of work on the farm to help defray other expenses.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

For admission to the School of Agriculture, the candidate is obliged to pass entrance examinations in Geography, English Grammar, including Orthography and Syntax, Arithmetic, and Algebra through Quadratics.

2. ARCHITECTURE.

The course of study in the department of Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Fac-

ulty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practised in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Weisbach's Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Seniors in the Course in Science will be allowed to take their specialty in architecture, and any student may attend the lectures on building materials and construction; but, with these exceptions, all students entering the department will be required to pursue the regular course of study.

3. CHEMISTRY AND PHYSICS.

I. SCHOOL OF CHEMISTRY.

The instruction given in this School is embraced in a full course occupying twelve terms, and in special courses. No special degree has been established for this course. But students who have completed it and taken in addition thereto the lectures on Political Economy, Professor Dwight's lectures on the Constitution of the United States, and Professor Gould's general lectures on Agriculture, are entitled to the degree of Bachelor of Science.

No additional fees are required for instruction in chemistry, or for the use of laboratories, but students will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices; they are also at liberty to procure laboratory supplies elsewhere. Each student will be required before beginning work in the Laboratory to make a deposit with the Assistant Treasurer of a small sum to cover the cost of the materials he may use.

The instruction in chemistry begins naturally with the course of lectures on general chemistry to the Sophomore class, and optional laboratory practice in the first term of the same year. This practice will consist in the performance by the student of a series of experiments, contrived and

arranged for the illustration of the more general principles of chemistry. It will be followed in the full chemical course by practice in qualitative analysis by which the student will become acquainted with the methods in common use for the detection of the more common elements and compounds, with the prominent reactions that are displayed when they are brought together in solution, and with the nature of the chemical changes involved in these reactions. After this a few of the more common gases will be examined, first qualitatively, and afterwards with reference to their quantitative composition; this, the first quantitative practice, will be followed by the determination of the specific gravity of solids, liquids, and vapors, processes purely physical in character, but yet of great importance to the chemist, and introducing the use of the chemist's most important instrument, the balance. Some synthetic quantitative practice with solids will then be taken up, after which will follow the usual system of practice in the various kinds of quantitative analysis.

The students who have thus far presented themselves for chemical laboratory practice have been, for purposes of convenience, arranged in eight classes; and the practice assigned to each class is adapted, as far as possible, to the object to be attained.

Full Chemical Course.—The work in this course may be completed by taking three hours per week in the first term of the Sophomore year, and eight hours during the other terms of that year, and twenty or twenty-five hours per week during the Junior and Senior years. For graduation in this course it is expected that the student, besides complying with the usual conditions for graduation, will take the full course in physics, including laboratory practice and photography, and other studies sufficient to make up at least six hours of recitation or lecture a term, besides his chemical work.

The class-room exercises in this course consist of (1) The course of lectures on general chemistry in the Sophomore year; (2) Exercises in the use of chemical formulæ and the solution of qualitative problems; (3) Recitations in Cooke's Chemical Philosophy, extending through two terms; (4) Lectures on the principles of quantitative analysis, and exercises in the solution of imaginary quantitative problems; (5) Lectures on chemical processes; (6) Lectures on recent chemical methods; (7) Lectures on metallurgy; (8) Lectures on vegetable and animal chemistry; (9) Lectures on organic chemistry; (10) Lectures on crystallography and mineralogy.

Chemical laboratory practice optional for mathematics. This course of practice was established for the benefit of students who wish to pursue the study of Science, without going farther in mathematics than trigonometry.

In order that a student may be qualified to take it, he must have attained proficiency sufficient for graduation in all the mathematics required in the first year in the Course in Science, and in the lectures on chemistry of the first term of the second year, and he must have performed satisfactorily the experimental work of that term.

The total time required for this laboratory practice will be two hundred and twenty hours, including the time required for introductory practice in the first term; but the satisfactory performance of the work required for this option will not consist simply in spending this amount of time at the laboratory table; the amount and quality of the work done must also be acceptable.

Chemistry as the Senior Specialty. This affords a good opportunity to those who have taken chemistry as an option for higher mathematics, of becoming still better acquainted with processes of analysis, and of attending the advanced courses of lectures on chemistry; or those who prefer to go on with the higher mathematics are enabled, by taking this chemistry in their Senior year, to go over the same ground as in the case of the option for mathematics, and to advance still further.

The time required will be three hundred and fifty hours, and in addition to this, the experimental work of the first term in the Sophomore year must have been satisfactorily performed.

Agricultural Chemistry.—The amount of chemistry to be taken in the full course in agriculture is greater than in the shorter one of three years. In the latter case, both the lecture-room and laboratory work are confined to what is more particularly agricultural chemistry; the practice in qualitative analysis is more limited, and the class-room exercises are confined to the lectures on agricultural chemistry. The work in quantitative analysis for all students in the agricultural course is laid out as far as possible with reference to agricultural chemical analysis proper. The student in the four-years course having already had general qualitative analysis, will be able to pass over the agricultural qualitative analysis very rapidly, and will have more time for the much more important and valuable practice of quantitative analysis. The time required for the performance of the agricultural chemical laboratory practice in the full course in agriculture will be three hundred hours, and in the shorter course of three years, three hundred and thirty hours.

Medical chemistry. This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to

him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Teachers' course. This is designed for students not in any particular course in the University, who desire to fit themselves for teaching chemistry in high schools and academies. The practice is much the same in character as that laid down for the option for mathematics, but more extended, and will require for its satisfactory completion four hundred or five hundred hours. The student in this course is recommended to take all the class-room exercises in chemistry, except the lectures on agricultural chemistry and recent chemical processes.

Technical course. This is designed for students who wish to devote themselves for a limited time to some one branch of technical chemistry. After more or less preliminary practice in qualitative and quantitative chemical analysis, according to the amount of time that can be given to laboratory practice, the student is allowed to turn his attention at once to the subject the technical chemistry of which he wishes to study.

Course in blowpiping. This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work, when it becomes necessary to make out the character of a rock or a mineral.

MINERALOGY.

Instruction in Mineralogy by lectures and practical exercises, is given during the third term, and in addition thereto, instruction in blowpipe analysis and in the detection of minerals by means of the blowpipe may be had during either of the terms of the year.

II. SCHOOL OF PHYSICS.

A new course in Physics has been adopted which will take effect the present year. The different subjects will be treated in the following order beginning with the first term of the second year and continuing six terms.

First Term.—Mechanics of solids, liquids and gases. *Second* and *Third Terms.*—Magnetism and electricity. *Fourth Term.*—Heat. *Fifth* and *Sixth Terms.*—Acoustics, optics and radiant heat.

The exercises will occur twice a week during the first three, and three times a week during the last three terms.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference:—Atkinson's Ganot's "Physics," Jamin "Cours de Physique" and "Petit Traité de Physique," Müller "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics."

Scientific students who enter this year upon their third year studies will take the course in Physics as given in the Register for 1873–74.

Besides the above general course, there will be an opportunity for a few students who wish to make physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course:—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

4. CIVIL ENGINEERING.

The full course of Civil Engineering extends through four years, and leads to the degree of Bachelor of Civil Engineering. (B. C. E.)

The whole course has for its object to lay a substantial foundation for disciplinary culture, mainly technical; and the last four terms are devoted to Engineering specialties.

The course of study has been modified by including free-hand drawing, machine-shop practice, blow-pipe analysis of minerals, geology, elementary and structural, metallurgy, astronomy, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate. To make room for these additional studies, some subjects of less practical importance to the engineer have been omitted.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analyses to the solution of engineering investigations, the professional preparation of the students under the care of this Faculty, comprises the following subjects:—

The location and construction of railroads, canals and water works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical coördinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions.

Besides the above, there is a course in surveying and another course in draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading, pen and colored topography, machine drawing, and the use of projection tables.

The degree of Civil Engineer is conferred, on the recommendation of this Faculty, upon those who, having taken the Bachelor's degree, shall have spent two years in additional special studies and actual practice, passed the requisite examinations, and presented a satisfactory thesis.

5. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught by this Faculty chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the Constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The Department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams

—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others. In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history—and thus to enlarge, by careful reference and reading, their acquaintance with the facts presented by the lecturers. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern history.

The School of Political Science, is intended to embrace all the important topics connected with political and social science. At present, courses of lectures are delivered, as will be seen below, on political economy and constitutional law.

The following is a list of the lectures given in this Department:—(1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2.) Modern history, and the philosophy of modern history, by President White. (3.) The general and constitutional history of England, by Professor Goldwin Smith. (4.) General history, and the philosophy of history, by Professor Wilson. (5.) History of the United States, by Professor Greene. (6.) American constitutional history, by Professor Dwight. (7.) Political economy, by Professor Wilson. Courses are given by President White, Professor Russel, Professor Goldwin Smith, and Professor Wilson during each Term, while the course by Professor Greene occurs in the Fall term, and that by Professor Dwight in the Spring term.

6. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

I. SCHOOL OF THE ANCIENT LANGUAGES.

I. THE GREEK LANGUAGE.

First Year.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

Second Year.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Iphigenia in Tauris); Æschylus (Prometheus); Aristophanes (Knights).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII; Greek philology and composition: Sophocles (Antigone, Electra); Plato (Laches).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from the Lyric Poets.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.*—Cicero (Essays and Letters). *Third Term.*—Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*—Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.*—Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

As the languages in this School are entirely optional and none of them required for any degree conferred by the University, no course of study has been definitely marked out in any one of them. But instruction will be given in Persian, Turkish, Chinese, Japanese, Sanskrit, Hebrew, and the other Semitic languages as there may be classes of students requiring them. In the department of "Hebrew and Oriental Literature and History" instruction will be imparted chiefly by lectures. The main subject of study will be the literature and history of the ancient Hebrews. As, however, experience shows that the national idea of this people cannot be studied to advantage, in its growth and developement, without some knowledge of the relations it bears to those eastern nations by which Palestine is surrounded, a preliminary course of lectures will be devoted to a discussion of such other forms of oriental thought and life as are important in this connection.

For a thorough appreciation of any literature a knowledge of the language in which it is written is indispensable. Those who desire to do so will have an opportunity to study the language of the Old Testament under the direction of the Professor of the department. It is to be hoped that in time, sufficient interest in this direction will be developed to warrant the

establishment of classes for the Arabic, Syriac, and other cognate languages to the Hebrew, and that Semitic philology in the term's best and widest sense will find a home at the University.

The lectures are delivered twice a week for the present, and only in the Spring and part of the Fall terms. The text-books of the Hebrew class for the ensuing year are Deutsch's Hebrew Grammar, and selections from the Hebrew Bible.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the student the principles of grammar and the use of idioms, with a fair knowledge of pronunciation, so that, at the end of his course, he may be able to read any modern work, and to converse with sôme degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term McGill's "French Grammar" is studied. This is completed in the second term, and the translation of Charles XII is begun, and is continued through the third term. In the second year modern French plays and "Littérature Française Classique" are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar; Il "Vero Amico," comedy of Goldoni; Silvio Pellico's "Le Mie Prigoni," and lectures on Italian literature.

Second Year.—Those pursuing a more advanced course will read the "Inferno" of Dante, and attend further lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar, in connection with exercises in writing; Moratin's "El Si de Las Niñas," and Cervantes' "Novas Ejemplares."

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year.*—Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German

Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. *Third Year.*—The reading consists of the first part of Gœthe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyesen's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," or Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

7. MATHEMATICS AND ASTRONOMY.

I. THE GENERAL COURSE.

The first seven terms of this course enter complete into the course of civil engineering. The courses in architecture and mechanic arts contain somewhat less pure mathematics. In other courses the pure mathematics, above trigonometry, are optional. Astronomy is taught in the third year of the General Course.

The following is the mathematical scheme:—

(*a*) For students in architecture, engineering, the Courses in Science, Philosophy, etc., including all the courses for which plane geometry is required for admission:—

FIRST YEAR.—*First Term.*—Selections from Olney's University Algebra. *Second Term.*—Solid geometry (Chauvenet). *Third Term.*—Trigonometry (from Chauvenet).

SECOND YEAR.—*First Term.*—Plane analytic geometry (Eddy's). *Second Term.*—Analytic geometry of three dimensions, calculus. *Third Term.*—Differential calculus, descriptive geometry.

(*b*) For students in Optional Courses, and in the courses in agricult-

ure, chemistry, etc., including all courses for which plane geometry is not required as a condition of admission:

FIRST YEAR.—*First Term.*—Plane geometry. *Second Term.*—Algebra. *Third Term.*—Solid geometry.

SECOND YEAR.—*First Term.*—Trigonometry (text-books as above). And for students in the Courses in Science, Philosophy, and the Mechanic Arts. *Second Term.*—Analytic geometry. *Third Term.*—Calculus, differential and integral.

THIRD YEAR.—*First Term.*—Integral calculus; descriptive geometry; astronomy. *Second Term.*—Integral calculus finished; shades, shadows and perspective: physical astronomy. *Third Term.*—Theory of functions.

FOURTH YEAR.—*First Term.*—Philosophy of analysis; elements of analytic mechanics. *Second and Third Terms.*—Modern methods in geometry, with rudiments of quantics.

II. ADVANCED COURSES.

Advanced courses of study in pure and applied mathematics are offered for resident graduates and special students. Further instruction will be given, if desired, in the subjects of the General Course; also in quaternions, the theory of numbers, least squares, celestial mechanics, and the mathematical theories of light and heat.

In these advanced courses, and in the later portions of the General Course, the use of works in the French and German languages will often be required.

8. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial Mechanics, Civil Engineering, Mathematics, and Practical Mechanics were early established and filled. Models illustrating mechanical movements, models of various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this Department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the same purpose. This department has thus been placed in a condition to do its work in the most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops

fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles of utility for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

Three courses of study have been arranged:—

(1) *A Four Years* or *Full Course*, upon the satisfactory completion of which the student will be entitled to the degree of BACHELOR OF MECHANICAL ENGINEERING.

The entrance examinations for this course this year are the same as heretofore: but hereafter six books of Geometry in addition will be required.

For a detailed statement of the full course see under the head of "Courses of Study" below.

(2) *An Optional Course* under the direction of the Dean. In this course entrance examinations in Grammar, Geography, Arithmetic and Algebra through Quadratics are required.

Attendance upon ten lectures or recitations per week or their equivalent, in addition to two hours daily shop practice, two hours daily in drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

(3) *A Special Course* has been arranged for such young men as have a fair knowledge of the machinist's or pattern-makers trade, who desire to fit themselves for foremen or leading positions in their business. They may enter the department without passing entrance examinations; but they are required to devote at least five hours per day to shop practice and four hours daily to machine or free-hand drawing, and to take such other exercises as may be prescribed by the Faculty of the Department.

The instruction in shop practice embraces the study and construction of

gearing and link-work, strength and proportion of parts, accurate surfaces (such as face-plates, straight-edges, right angles, etc.), shop accounts, management, etc.

On leaving the University a certificate of proficiency and attendance will be granted.

9. MILITARY SCIENCE.

In order to carry out the design of the United States Government in making the grant of land, the Trustees have ordered that Military Instruction, including Drill, shall be obligatory on all students, with such exceptions only as the necessities of the case may require. The instruction provided for and required is such as to qualify them "for organizing a company and taking command of a battalion."

Military Organization of the Students.—At the opening of academic exercises each year, the students are formed into a military organization. The exercises in the School of the Soldier and Company are conducted by the officers, selected from among the students, under the superintendence of the professor. Students under the military organization are considered as holding the military rank of cadet, and the term "Corps of Cadets," is the designation adopted for the students so organized. Arms and equipments are furnished in accordance with a special legislative enactment. For the purpose of drill the corps is divided into battalions. The staff consists of one adjutant of the corps, one quartermaster, and one or more adjutants. Each company has one captain, one first lieutenant and one second lieutenant, one first sergeant, four sergeants and four corporals. The captains and lieutenants are appointed from the undergraduates of the University. All members of the advanced classes, not acting as officers or non-commissioned officers, are liable to do duty as private cadets. Promotions are made for the year, by selection, in view of military aptitude, general deportment and proficiency in studies, upon the recommendation of the professor, with the advice of the Faculty and the approval of the President. They are announced in orders by the Professor. The practical military and other exercises are so ordered as to subserve the ends of a complete system of physical culture—an object of vital moment during the critical period of life usually comprised within university years.

All students are required to observe and conform to such regulations as may, from time to time, be promulgated by the Professor, relating to the matters under his supervision, and the orders of their officers in the military organization. They are required to provide themselves, as soon as practicable after admission, with the University uniform for drill and par-

ade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe, according to the nature of the case.

Military Exercises.—These require of all students, unless they are specially excused by the proper authority, attendance upon the practical instruction in military tactics embracing the following subjects:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable, (3.) *Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field works; military mining; the attack and defence of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army: strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

Students taking the advanced course of instruction, amounting to three recitations or lectures per week, and performing the duties of a commissioned officer, are entitled to have it credited to them as the *specialty* required in the fourth year of the Course in Science.

10. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will af-

ford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

Requirements for Admission.—In addition to the elementary branches required for admission to any part of the University, this Faculty requires, as preparatory to a full course, leading to a degree:—PLANE GEOMETRY—six books; PLANE TRIGONOMETRY; LATIN—Allen's Latin Reader, or its equivalent, with an adequate amount of grammatical knowledge; GREEK—the alphabet, and so much of the language as will enable the student to recognize, analyze, and form scientific technical terms; and PHYSIOLOGY—an acquaintance with the technical terms employed in the science, including the names of all the organs, tissues and general functions. An idea of this latter requisite may be gained from the glossary appended to the following smaller works:—Dalton's, or Hutchinson's, or Cutter's (1871) "Physiology;" but the student is advised to select and read in advance the works he intends to use in the University. This Department consists of the following Schools:—

1. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or Spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany; field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of sys-

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tematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the principles involved in the natural system of classification. The prominent species of each order are also considered, especially those of importance as agricultural, medical, economic, or ornamental plants; or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany. The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany. In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required. In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

II. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

The instruction in this school is as follows:—(1.) A course of lectures by Professor Hartt on Geology and Physical Geography, delivered during the Spring term of the third year. (2.) A course of lectures on advanced structural Geology, by Professor Hartt, in the second term of the fourth year. (3.) A course on palæontology, with special reference to the fossil fauna of the vicinity of Ithaca, by Instructor Derby, in the first term of the third year. (4.) Laboratory practice and field work under Professor Hartt and Mr. Derby. This is intended to meet the wants of two classes: the special students, who intend to devote their life to geology or palæontology, and the general students, more especially those of the Natural History course.

At present, owing to the lack of the requisite geological models, labora-

tory practice is limited to the study of fossils and rocks. Field work during the term is confined to the study of the geological formations of the vicinity of Ithaca.

The early training of all geological students consists in the personal, critical examination of specimens, the student being required to find out every thing for himself, without the consultation of books. On entering the laboratory, one or more good specimens are placed before him, the difference between *seeing* and *observing* is explained, and he is directed to observe, as carefully as possible, all their characters, and record in drawing and writing, in a suitable book, his observations just as he makes them, a drawer being assigned to him for the preservation of his book and specimens, so that an opportunity is afforded for following every step he takes. Having carefully observed several specimens of more or less nearly related forms, he is then required to compare these with one another, and determine what characters are common to all, or what distinguish each. Only after he has completed this work for himself, is he allowed to consult authorities, and, by comparing his own work with that of a master, test the accuracy of his own results. The aim of this system is to give the student training by doing a little thorough work for himself. This manner of working is apt to appear tedious to the new beginner, and, just as might be expected, those who are not fitted for palæontological studies fail in making progress, and are weeded out; but the student who possesses requisite ability is sure to become enthusiastic and go rapidly ahead. Students are required to collect the fossils of the vicinity, and to separate the forms without the aid of books, disregarding, to begin with, the names of the species, upon the learning of which he is at first inclined to place too high a value.

After the training of the first year, the special student is recommended to spend a vacation in the investigation of some field, if possible, new to science, and to make and record observations, and collect rocks and fossils, which he must work up on his return to the laboratory. In this way, before the end of his course, he will have had a good, preliminary training and have, at least, commenced original work upon some subject; but he must not expect to graduate, at the end of four years, a finished geologist or palæontologist; and it is earnestly recommended that he should continue special work in the department, as long as possible after graduation.

The University is furnished with a good and rapidly increasing library of geological and palæontological works, and a large collection of fossils and rocks, to which the student may have access.

The training of the laboratory students, who do not intend to become specialists, consists in the examination of fossils and rocks, but the course is more general than that for the special student, and is varied to meet the ability, and, to some extent, the taste of the individual.

Short excursions are made every year during term time, and, occasionally, long expeditions in vacation. Two expeditions have been made to the Amazonas, which have resulted in much good to the department, not only in training students in actual field work, but in adding very largely to the collections.

Two important memoirs have been published on the Brazilian collections by Instructor Derby and Mr. Richard Rathbun. A voluminous final report by Professor Hartt on the results of the expeditions, is nearly ready for the press.

Text-books, etc.—The text-book required for the students in Geology is Dana's Manual of Geology, edition of '74. The excellent geological library of the University is open to the students for reference.

III. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1.) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2.) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3.) A course of thirty-five lectures on psychology and æsthetics, by Professor Wilson. In the Winter term, (1.) A course of thirty lectures on general zöology, by Professor Wilder, and (2.) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3.) A course of fifty lectures upon veterinary medicine and surgery, by Professor Law. In the Spring term, (1.) A course of twenty lectures upon comparative anatomy, by Professor Wilder. (2.) A course on economic entomology, by Instructor Comstock. (3.) Lectures on the natural history of man, forming part of a course in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians are required to dissect, first, the common animals, then monkeys, and afterward human subjects, when they can be procured. Special attention is given to the animals inhabiting Cayuga Lake and the vicinity of Ithaca. Instruction is given in the methods of collecting, preserving and arranging anatomical and zöological specimens.

Books of Reference.—Students are at liberty to select from the following list of works for reading upon the subjects treated of in the lectures:—Flint's "Physiology of Man" (only four volumes are now published, the forthcoming volume treating of Reproduction); Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's "Physiology and Hygiene." In comparative anatomy—Owen, Huxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies—Wyman ("Symmetry and Homology in

Limbs"), Wilder ("Intermembral Homologies.") In zöology—Agassiz ("Essay on Classification," or "Methods of Study in Natural History"), with Tenney ("Manual of Zöology") or Milne-Edwards ("Elements of Zöology"). In economic entomology and ornithology—Packard, Samuels, the New York State Reports, and Riley's Reports on Entomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily pursued a partial or special course, there will be given a certificate, stating the time he has spent, the studies pursued, and his degree of excellence therein. It will be signed by the President of the University and the Dean of the Faculty. A student who has completed the full course of four years, will be recommended for the degree of BACHELOR OF SCIENCE.

II. PHILOSOPHY AND LETTERS.

I. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of "Wilson's Psychology Comparative and Human," with Lectures.

In the Winter term of the Junior year the class will have Moral Philosophy.

Spring Term.—Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation. Wilson's "Text-book" will be used with additional lectures and illustrations.

FOURTH YEAR.—*First Term.*—"Wilson's Introduction to the Study of Metaphysics and the History of Philosophy;" with lectures twice a week, on the History of Philosophy and the general progress of human knowledge from the commencement of Greek Civilization to the present time.

Second Term.—Political Economy.

Third Term.—Dr. Wilson gives his lectures on the Philosophy of History to the Seniors, being a part of the course in "History and Political Science." The lectures occur twice a week, and are intended to explain the rise and progress of civilization, and the causes that have contributed to it.

II. SCHOOL OF LETTERS.

The study of the English language and literature, including the explanation and illustration of the structure, growth and peculiarities of the language, is incorporated into each of the General Courses.

The School embraces two departments, one of Anglo-Saxon and English Literature, and the other of Rhetoric and General Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, and embraces the following schedule of exercises and lectures:—

In the Course in Science:—

SECOND YEAR.—*First, Second, and Third Terms.*—Vocal Culture and Declamation.

THIRD YEAR.—*First Term.*—Lectures on the English language and literature, from Chaucer to Milton, inclusive. *Second Term.*—Lectures on the English language and literature, from Dryden to Cowper, inclusive. *Third Term.*—Lectures on English and American literature of the nineteenth century. A Syllabus of the course, prepared by the Professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric. *Third Term.*—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum, Proclamation of King Henry III., and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

2. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and the first year is devoted to English diction and construction, with progressive exercises and criticisms of language and expression. The instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; to extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also lecture on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions; readings from Shakespeare and Burke. *Second Term.*—Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose; orations, essays, and discussions.

JOURNALISM.

Although no special course in Journalism has been marked out, students wishing to prepare themselves for Journalism or the profession of Law, who nevertheless cannot take a full course of four years, may, with the same qualifications for admission as are now required for the course in Science, and some elementary knowledge of Latin, arrange for themselves an optional course, that can be completed in two years, which will include (1.) one year of French, (2.) one year of German, or two years of either or both the above languages, (3.) all the studies and exercises in rhetoric,

composition, oratory and general literature, (4.) most of the studies in moral and intellectual philosophy, including psychology, logic, moral philosophy and the history of philosophy, (5.) all the studies in the departments of history and political science.

IV. POST-GRADUATE COURSES.

No regular post-graduate courses have been marked out by the various Departments of the University. It is found that in most cases, students who desire to spend a portion of time at the University after taking their Baccalaureate Degree, have each of them some one special study to pursue, or object to accomplish, which differs in so many respects from those of any other student, that it is hardly possible to classify them, or to arrange beforehand, in any general way, a course that will meet their wants. Accordingly, the practice thus far has been for the student himself to indicate on his entering the University his wishes; and in case the studies he wishes to pursue are not already provided for in the Schedule for the term, his application is referred to the appropriate Faculty or to some one Professor who is in charge of the department in which his studies are chiefly comprehended, when a course is arranged for him and provision made for his prosecuting it.

Means and Facilities for Education.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls, as well as the lower stories of the others, are devoted to lecture-rooms. The other halls contain, in each building, twenty-four sets of rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING there are ten lecture-rooms and the veterinary collections. In the NORTH BUILDING are the Horace Mann Herbarium, and the Hall of the University Literary Societies. It contains fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE McGRAW BUILDING.

This buildings, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone quarried on the University grounds, but with dressings and cornices of Onondaga gray limestone. In its architecture it also corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter con-

taining three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and on the second floor are the various Museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath this are the rooms at present occupied by the School of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory, and in the third story a large Lecture Room. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University and the nine smaller bells of the McGraw chimes. The interior of the McGraw building is solidly finished in native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of over six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. Designed for the Department of the Mechanical Arts, it affords accommodation to that department, and, temporarily, to the Department of Botany. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professors of Industrial Mechanics, and of Botany and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE.

This is the gift of Honorable Henry W. Sage, and is now in process of erection. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will accommodate about one hundred pupils and will be completed in the spring of 1875. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE UNIVERSITY CHAPEL.

The University Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require. Here are held regular services on each Sunday. The discourses spoken of above—under the head of religious instruction, are delivered in this Chapel.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above it. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. In this building also is the Registrar's Office and the room in which the Faculty hold their meetings. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream, and enter the University campus on the south side.

II. MACHINE SHOP.

The Machine Shop, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles and for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, and a grinding machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard gauges in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam engine in case of accident to the water power.

III. CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in General Chemistry, and a smaller one for the class in Agricultural Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors, and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunsen filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

IV. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but the best practical provision for this work has been made. The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illus-

trative experiments. Several rooms in the south building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarised light, and photometry. In the Chemical Laboratory building a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Duboscq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Duboscq, a large collection of acoustic apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet made at the University work-shop, etc.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

V. THE FARM.

The University Farm consists of nearly two hundred acres exclusive of the campus, and has hitherto been worked upon the system of farming usually followed in the neighborhood.

Much of the farm will now be devoted to experiments, and the characteristic feature in the management of the remainder will be the concentration upon a small area of the labor and capital usually employed upon a large one. By thorough cultivation and liberal manuring, each acre will be made to yield its maximum produce, this produce being mainly of such a kind as will, consistent with the soil and climate, be most suitable to the summer and winter house-feeding of cattle. The in-door or farm-yard management will be characterized by the strictest economy in the consumption of this produce, and every reasonable suggestion of science and practice to this end will be acted upon.

The most improved breeds of farm animals will be kept, and thus, not only will the food consumed be turned to the best account, but the students will have an opportunity of becoming intimate with the characteristics of the different breeds; and the farmers of the country will have the privilege of availing themselves of these fine-bred animals to improve their respective herds.

It will be readily seen that while the programme here sketched is in its entirety one experiment, its practical working will at the same time involve several concurrent though subsidiary problems. It cannot but be of much importance to the country. Thus, for instance, it will involve experiments upon, or afford illustrations of, such matters as rotative cropping, summer soiling, winter house-feeding of cattle, and the growth of crops most suitable for these purposes; the comparative merits of raised and flat drill husbandry; of fall and spring plowing; of green and naked fallows; of box-feeding and stall-feeding; of pure breed and grade cattle; and the advantages to be derived from pulping, chaffing and cooking the roots and fodder for winter use; the employment of steam power in the work of the farm yard, etc., etc.

It is evident that a system of farming involving, as this does, both the growth of crops hitherto but little if at all produced in the country, and farm operations and manipulations of the soil not now practised, would demand a class of implements peculiar to itself and differing in many respects from those in use. To meet this difficulty, and to give the system a fair trial, the Trustees have thought it advisable to import at the outs such implements as are indispensable to carry it out. Should the contemplated system prove a success, these implements may at least furnish such suggestions to the ready ingenuity of our manufacturers as will enable them to supply implements still better suited to the purposes for which they are designed, and more in harmony with the ideas of our own farmers.

As the essence of the system here sketched consists in raising to the highest standard the condition of the soil, and therefore its productive power, it will be evident to any one acquainted with farming that the accomplishment of this object will require time, and that although a year or two may enable us to anticipate with some degree of accuracy the result of the experiment, its ultimate success or failure cannot be positively pronounced upon until the rotation has passed at least once over the farm, as it will require that time to put each division under the renovating and cleansing crop. It is further evident that the high price of labor is the principal obstacle to be overcome in advanced agriculture. But we are sanguine that by the more extended use of labor-saving implements, and the horse, in the operations now so often performed by hand, the limit of profitable farm labor may not only be reached but accurately defined.

This element (the economy of labor) has been, and will be, kept prominently in view throughout the experiment. In the arrangement of the farm barn it forms a leading feature, and in the working of the farm every labor-saving implement required will be employed. It is plain that on

a large farm such appliances could be used at a comparatively less expense than on a small one; and this is a fact that should be taken into account in summing up the result of the experiment.

The statistics of this experimental farm are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

VI: THE BARNS.

Mr. Cornell has recently added to his other gifts that of a barn, to be used in connection with the farm. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five thousand square feet, is divided into box-feeding stalls, sheep pen, horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The upper story, fifteen feet high and covering the same area, will be used for storing hay and grain. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

The old barns near the University buildings have been repaired and adapted to experiments in summer soiling milch cows. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and illustration the best tools of their kind that the market affords.

VII. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work, and in various languages. From it have been issued the UNIVER-

SITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

At the beginning of the present year, the facilities of the printing office were increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting will be provided with work and the means of further instruction.

VIII. THE UNIVERSITY LIBRARY.

The University Library numbers at present thirty-eight thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRARY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over

one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelly, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library, which now occupies its new quarters in the McGraw Building, is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible ; the first one —Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

IX. THE READING ROOM.

The library is open and accessible to all registered students every weekday from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:

AMERICAN.

American Journal of Science,	Harper's Magazine,
Atlantic Monthly,	Historical Magazine,
Canadian Monthly,	Horticulturist,
Country Gentleman,	Journal of the Franklin Institute,
The Nation,	Official Gazette of the Patent Office,
Monthly report of the Department of Agriculture,	Prairie Farmer,
	Railroad Gazette,
New York Medical Journal,	Railway Review,
North American Review,	Specificatians of Patents.

ENGLISH.

Anthropological Review,
Athenæum,
Blackwood's Magazine,
Bookseller
Builder,
Chemical News,
Edinburgh Review,
Engineer,
Examiner,
Frazer's Magazine,
Guardian,
Illustrated News,
Journal of the Geological Society,
Journal of Microscopical Science,
Journal of the Royal Agricultural Society,
Mechanics' Magazine,
North British Review,
Notes and Queries.
Pharmaceutical Journal,
Philological Society's Proceedings,
Popular Science Review,
Quarterly Journal of Science,
Quarterly Review,
Saturday Review,
Spectator,
Veterinarian,
Westminster Review.

FRENCH.

Annales de Chimie,
Annales des Mines.
Annales des Ponts and Chausées,
Bibliographie de la France,
Bulletin du Bibliophile,
Bulletin de la Sociétié chimique,
Comtes Rendus,
Illustration,
Journal de l'Agriculture,
Journal de l'Anatomie,
Journal de Mathématique,
Journal de Menuisérie,
Nouvelles Annales de Mathématique,
Recueil de Médecine vétérinaire,
Revue des deux Mondes,
Revue de l'Architecture,
Revue politique et littéraire,
Revue scientifique,
Revue de Zoölogie.

GERMAN.

Annalen der Chemie und Pharmacie,
Annalen der Physik,
Archäologische Zeitung,
Archiv für Anatomie,
Archiv für das Studium der neuren Sprachen,
Chemisches Centralblatt,
Fortschritt der Physik,
Hermes,
Historische Zeitschrift,
Illustrirte Zeitung,
Im neuen Reich,
Archiv für mikroskopische Anatomie,
Archiv für pathologische Anatomie,
Bauzeitung,
Beiträge für Sprachforschung,
Bericht der deutschen Chemischen Gesellschaft,
Literarischer Wochenbericht,
Milch Zeitung,
Palæontographica,
Petermann's Mittheilungen,
Philologus,
Polytechnisches Journal,

Jahrbuch für wissenschaftliche Botanik,
Jahresbericht für Chemie,
Journal für praktische Chemie,
Journal für Mathematik,
Landwirthschaftliche Versuchs-Stationen,
Landwirthschaftliches Centralblatt,
Literarisches Centralblatt,
Repertorium der Thierheilkunde,
Repertorium für Experimental Physik,
Rheinisches Museum,
Zeitschrift der morgenländischen Gesellschaft,
Zeitschrift für analytische Chemie,
Zeitschrift für bildende Kunst,
Zeitschrift für Sprachforschung.

X. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Freres Chretian of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern slides to be used in the camera as illustrating various remarkable buildings and as well as the various styles of architecture

The architectural department in the University Library is particularly

full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—(1) THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modeles Clastiques* of plants, on a magnified scale, made by Auzoux of Paris, and plant models designed and executed by Brendel of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil by Professors Prentiss and Hartt and Mr. Derby; (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh; (5) A small collection of economic vegetable products.

4. GEOLOGY AND MINERALOGY.

This Museum comprises:—(1) The JEWETT PALÆONTOLOGICAL COLLECTION, embracing a large number of species of fossils, principally from the New York formations, many of which are illustrated by type specimens figured and described in the Reports of the New York State Geological Survey; (2) A considerable collection of fossils and rocks illustrating the geology of Ithaca and vicinity; (3) The HARTT COLLECTION of fossils and rocks, mainly from the British Provinces and Brazil, deposited in the Museum; (4) The collections of fossils and rocks made by Professor Hartt and his party on the two Morgan expeditions to the Amazonas in 1870 and 1871; (5) The WARD COLLECTION of casts of fossils, presented to the Museum by Mr. Cornell; (6) Miscellaneous collections of fossils, rocks and ores, from various parts of the world, obtained through exchange or gift; (7) A collection of several hundred photographic lantern-slides illustrating the lectures in geology, physical geography and palæontology; (8) A collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard, on the Amazonas in 1870 and 1871; (9) THE SILLIMAN MINERALOGICAL COLLECTION; (10) A collection of skeletons from the Anglo-Saxon Cemetery at Frilford, England, together with a variety of ethnological relics taken from the same place, the whole presented by Professor George Rolleston, of the University of Oxford.

5. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art at the present time, as well as a collection of curious things pertaining to the department, is being made and will comprise arms of various patterns, shot, shell, and the various kinds of ammunition in use in the Army of the United States. It is believed that the student being familiarized with the different articles and their nomenclature, will be enabled to comprehend much better the technical statements of military history; and if his services are required by the national government this information will be of advantage.

6. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoölogy, which are available for the educational purposes of the University, are made up of the following:—(1) THE GREENE SMITH ORNITHOLOGICAL CABINET, a mounted and classified collection of 362 birds, principally American, made and presented to the University by Mr. Greene Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL COLLECTION, including about twenty-five thousand species; (3) The *Modeles Clastiques* of Dr. Auzoux, of Paris, illustrative of comparative anatomy and physiology; (4) The lithographic charts and diagrams edited by Achille Comte, of Paris, and those published under the auspices of the Council of Education at London; (5) A constantly increasing collection of native animals in alcohol, and of preparations illustrating their structure; (6) A collection of insects to which additions are constantly made, specially intended to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoölogical specimens deposited by Professors Wilder and Hartt.

XI. COLLECTIONS IN THE FINE ARTS.

The foundation of a Museum of the Fine Arts has been laid by depositing in the University, for the use of the Faculty and undergraduates, the following:—(1) A valuable collection of photographs, especially rich in illustrations of architecture and of art applied to manufactures; (2) Paintings in oil, including full length portraits of Professors Goldwin Smith and George William Curtis, by Carpenter, presented by President WHITE; with portraits of Humboldt, Peter Cooper and Prudence Crandall; (3) Bronze copies of masterpieces of statuary, including three of Michael Angelo's works, two busts by Burton, one of President WHITE, a gift of some friends of the President, and the other of Professor WIL-

SON, a gift of the Students of the University, and an original bust of Lincoln; (4) Many portfolios of engravings illustrative of Christian art, and of the history of art in general, including the publications of the Arundel Society and the Berlin Museum series, as well as the series of heliotype reproductions of the Gray Collection.

XII. UNDERGRADUATE SOCIETIES.

The following associations have been formed by the undergraduates:— (1) A Natural History Society; (2) A Chemical Club; (3) An Agricultural Club; (4) An Engineering Club; (5) A Society for Mechanical Engineering; (6) Four literary societies, known as the "Irving," the "Philalatheian," the "Adelphi," and the "Curtis;" and (7) a "Christian Association," meeting Thursday evenings and on Sunday afternoons.

Degrees and Prizes.

THE DEGREE OF BACHELOR.

1. The degree of BACHELOR OF SCIENCE is conferred upon such students as have successfully pursued the Course in Science. It will also be conferred upon those students who, after having passed through the first two years of the general Course in Science, or any equivalent course, shall have also completed any one of the Special Courses, and, in addition thereto, shall have attended the Course of lectures on general agriculture, on constitutional history, and on political economy.

2. The degree of BACHELOR OF LITERATURE is conferred upon such students as have successfully pursued the Course in Literature.

3. The degree of BACHELOR OF PHILOSOPHY is conferred upon such students as have successfully pursued the Course in Philosophy.

4. The degree of BACHELOR OF ARTS is conferred upon such students as have successfully pursued the Course in Arts.

5. The degree of BACHELOR OF CIVIL ENGINEERING is conferred upon such students as have successfully pursued the Course in the School of Civil Engineering.

6. The degree of BACHELOR OF VETERINARY SCIENCE is conferred on those students who have taken the full four years' Course in that department and passed all the examinations satisfactorily.

7. The degree of BACHELOR OF ARCHITECTURE is given to those who have satisfactorily completed the Course in the School of Architecture.

8. The degree of BACHELOR OF AGRICULTURE is conferred on those who have successfully pursued the four years' Course in Agriculture.

9. The degree of BACHELOR OF MECHANICAL ENGINEERING is conferred on those who have successfully pursued the four years' Course in that Department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the Course leading to it in precisely the same order as it is laid down in the statement of Courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are to be substituted.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out, to which all graduates of this or similar institutions may be admitted.

1. Any student who has taken the Bachelor's degree either in Arts or Science, may take the Master's degree in the same course, on either of the following conditions:—

a. After three years spent in literary pursuits, either teaching or study, (which study shall not have been exclusively professional,) on passing an examination in some department of Science or Literature, and presenting to the Faculty a satisfactory thesis on some subject agreed upon between the student and the Faculty. Or,

b. After having passed one year in post-graduate studies, either at this University, or elsewhere with the consent and approval of the Faculty, on passing his examinations and presenting a satisfactory thesis on some subject within the department of study to which he has chiefly devoted his attention.

2. The degree of DOCTOR OF PHILOSOPHY will be conferred on Bachelors of Arts, Literature, Science, or Philosophy of this University, and on such graduates in the Bachelor's degree of other Colleges or Universities as shall satisfy the Faculty that they have completed a course equivalent to one of the four General Courses in this University, on the following conditions:—

(1) A knowledge of Latin and Greek equal to what is now required for admission to this University in the Classical Course.

(2) Two years spent at this University after graduation in the pursuit of studies in some post-graduate course, and passing satisfactory examinations in them.

(3) Presenting a meritorious thesis based on some original investigation in one of the departments in which the studies were pursued.

Provided, however, that they have taken their studies in such courses not strictly professional in character, as have been or may hereafter be specifically established for this Degree.

3. The degree of CIVIL ENGINEER is conferred upon such Bachelors of Civil Engineering as, after six terms or two years of additional study and practice, shall have passed the requisite examinations in the School of Engineering.

4. The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of B. V. S., and who shall have passed satisfactory examinations therefor.

5. The degree of ARCHITECT is given to any Bachelor of Architecture who shall pursue a post-graduate course of two years in the study and practice of Architecture in the University.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Each candidate for an advanced or second degree whose thesis is accepted, and who is successful in his application, will be required to print the thesis at his own expense and present fifty copies to the University.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates, or certificates of proficiency, are conferred upon students who have pursued a Special Course in any branch of knowledge. They are given upon the recommendation of the Deans of the respective Faculties.

CERTIFICATE OF JOURNALISM.

Although no special course has been arranged in journalism, arrangements have been made for giving special instruction to those who intend to make journalism their profession. These arrangements consist, so far as the University is concerned, in

1. The art of printing. Students will be required to do work at type-setting in its various branches, the reading and correction of proofs, the making up and working off of forms, in the University printing office, under the direction of the Director of the University Press, to such an extent that they will be able to take charge of an office and do book and job work by themselves.

1. Instruction in journalism proper. This will consist of a course of

lectures which will embrace the history of the origin, growth and development of the periodical press in Europe and America; notes on the peculiar characteristics of the journals of the different countries, on the relations of different branches of journalistic labor to each other. Practical instruction will also be given on methods of collecting and arranging news, on the proper "make up" of a newspaper, and so forth.

Besides this, students will be required to study phonography, under an approved teacher, and to acquire some knowledge of telegraphy.

To all students in either of the General Courses who shall have complied with the foregoing conditions there will be given, in addition to the Diploma appropriate to their course, a *Certificate in Journalism*, signed by the University authorities and the University seal affixed, as follows:

1. To all students in the Course in Literature, or in that in Philosophy, who shall have satisfactorily completed the course.

2. For students in the Course in Arts it will be further required that they shall have taken at least one term in French and two in German in their course.

3. Of students who have completed the Course in Science it will be required that they shall have taken all the studies that are in that course in the Departments of History, of Languages and of Philosophy and Letters, and shall have prepared themselves *outside of the University course* to pass, before the beginning of their fourth or Senior year, a satisfactory examination in Latin Grammar and some Latin Reader, sufficient to enable them to read and translate ordinary Latin sentences.

SIXTH ANNUAL COMMENCEMENT.

ORDER OF EXERCISES.

The Lord's Prayer.

1. ORATION: Mirabeau, JOHN DANIELS CASE, *Vernon*
2. *THESIS IN MECHANIC ARTS: The Slide-Valve and its Connections, WILLIAM NACE SMITH, *Canajoharie*
3. ESSAY IN ARCHITECTURE: The principles of Gothic Architecture, BYRON ERASTUS SHEAR, *Clayville*
4. *THESIS IN CIVIL ENGINEERING: The Practicability of Lowering the Surface of Cayuga Lake, FRANK WILLIAM WARTHORST, *Birkenfeldt, Germany*
5. ORATION: "The Spectator" and Modern Journalism, EMILIUS OVIATT RANDALL, *Columbus, Ohio*

*Not presented to the public.

6. THESIS IN AGRICULTURE: Scientific Foddering,
JOHN LEMUEL STONE, *Waverly, Pa.*
7. *THESIS IN CIVIL ENGINEERING: The Ventilation of Mines,
WILLIAM REED FITCH, *Ithaca*
8. ORATION: Moral and Political Specifics,
WILMOT MOSES SMITH, *Hauppauge*
9. *PHILOSOPHICAL ESSAY: The Materialism of the Present Age,
GEORGE ROE VAN DE WATER, *Flushing*
10. *THESIS IN BOTANY: Mosses,
WILLIAM ASHBROOK KELLERMAN, *Cedar Hill, Ohio*
11. ESSAY IN CIVIL ENGINEERING: Windmills as a Motive Power,
FRANK CONWAY TOMLINSON, *Ironton, Ohio*
12. ORATION: The Ultimate Tendencies of Science,
HORACE MILTON KENNEDY, *Oneida Castle*
13. ESSAY IN CIVIL ENGINEERING: A design for the Collective System and Water Supply of Ithaca,
WILLIAM HENRY JANNEY, *Forest Hill, Md.*
14. *ORATION: The Conflict between Science and Religion in its Latest Phase, HERMAN LE ROY FAIRCHILD, *Brooklyn, Pa.*
15. *ESSAY IN HISTORY: La Gironde, THOMAS HAMPSON, *Newburgh*
16. ESSAY IN SCIENCE: The Law of Metamorphosis in Plants, Historically Considered,
WILLIAM RUSSELL DUDLEY, *North Guilford, Conn.*
17. *ORATION: The Elevation of Labor,
GEORGE TAYLOE WINSTON, *Windsor, N. C.*
18. *THESIS IN CIVIL ENGINEERING: Valve and Link Motion as Applied to the Locomotive, LEWIS PETER TIER, *Norwalk, Ohio*
19. ORATION: Rome as Mirrored in Horace,
WILLIAM HASTY FLINT, *Chicago, Ill.*
20. *ORATION: Charles Sumner as a Representative Man,
LOUIS MILLS FULTON, *Hogansburg*
21. *THESIS IN ARCHITECTURE: Utilitarianism in American Architecture, BENEDICT WILLIS LAW, *Litchfield, Conn.*
22. WOODFORD ORATION: The Grecian and the Gothic Architecture as Exponents of the Religious Sentiment,
JAMES FRASER CLUCK, *Niagara Falls*

Presentation of Prizes.

Conferring of Degrees and Certificates by the President.

Benediction.

DEGREES CONFERRED IN 1873–4.

The following is a list of those who received degrees at the annual Commencement at the close of the sixth academic year, together with the degrees conferred and the residence of each recipient:—

BACHELORS IN ARTS (4).

JAMES FRASER CLUCK, ... Niagara Falls.
SOPHY PHILLIPPA FLEMING, ... Ithaca.
WILLIAM HASTY FLINT, ... Chicago, Ill.
HORACE LEE HOUSE, ... Forestville.

BACHELORS IN LITERATURE (4).

THOMAS HAMPSON, ... Newburgh.
BIRCHARD AUSTIN HAYES, ... Fremont, Ohio.
HORACE MILTON KENNEDY, ... Oneida Castle.
GEORGE TAYLOE WINSTON, ... Windsor, N. C.

BACHELORS IN PHILOSOPHY (3).

NELSON WARNER CADY, ... Indianapolis, Ind.
LOUIS TOURNIQUET HENDERSON, ... Ithaca.
EMILIUS OVIATT RANDALL, ... Columbus, O.

BACHELORS IN SCIENCE (28).

CHARLES WALTER CANDEE, ... South Butler.
JOHN DANIELS CASE, ... Vernon.
WILLIAM RUSSELL DUDLEY .... North Guilford, Conn.
HERMAN LE ROY FAIRCHILD, ... Brooklyn, Pa.
LOUIS MILLS FULTON. .... Hogansburg.
HEZEKIAH MOFFAT GILLETT, ... Le Roy.
JOHN TITUS HAY, ... Morris.
JEHIEL TUTTLE HURD, ... Flushing.
EVA MARIA PITTS, ... Honeoye.
CORNELIA ALICE PRESTON, ... South Dover.
CHARLES HENRY RAMSAY, ... Albany.
GEORGE SCOTT SHEPPARD, ... Penn Yan.
WILMOT MOSES SMITH, ... Hauppauge.
CHARLES WESLEY SOULBY, ... Milford, Mich.
JAMES HARDING SOUTHARD, ... Toledo, Ohio.
ALBERT CHILDS STANDART, ... Detroit, Mich.
WLASTIMIL SWATY, ... Ahnapee, Wis.

William Palmer Thompson..............Mt. Pleasant, Ia.
George Baxter Upham,..................Claremont, N. H.
James Duncan Upham,...................Claremont, N. H.
Mynderse Van Cleef,...................Ithaca.
George Roe Van De Water,............Flushing.
Robert Hall Wiles, ...Butler, Mo.
Charles Caldwell Wood,...............Lockport.
Frederick Camp Wood,...................Buffalo.

GRADUATES IN CHEMISTRY, B. S. (1).

James Harvey Pierce,....................Wilmington, Del.

GRADUATES IN NATURAL HISTORY, B. S. (1).

John Henry Comstock,...................Scriba.
William Ashbrook Kellerman, ...Cedar Hill, Ohio.

BACHELORS IN AGRICULTURE (2).

William Rane Lazenby,..................Bellona.
John Lemuel Stone, ...Waverly, Pa.

BACHELORS IN ARCHITECTURE (6).

George Berry,...............................Afton, Minn.
Francis Woodworth Cooper,............Spencer.
Benedict Willis Law,.....................Litchfield, Conn.
William Morton Jackson Rice, ...New York City.
Byron Erastus Shear, ...Clayville.
Sereno Edwards Todd, ...Closter, N. J.

BACHELORS IN CIVIL ENGINEERING (15).

Fred. Barber Alexander,................Fitchburg, Mass.
John Alexandrovitch Dobroluboff,....Nijny Novogorod, Russia.
William Reed Fitch, ...Ithaca.
Reuben Burdick Foster,..................Elmira.
Wallace Green, ...Clinton, Wis.
Horace Mack Hibbard,....................Ithaca.
William Henry Janney,..................Forest Hill, Md.
Elias Fausto Pacheco Jordao, ...San Paulo, Brazil.
Charles Hamilton Lay,...................Oil City, Pa.
Henry Gregory Northrup, ...Ithaca.
Horace Brady Robinson, ...Academia, Pa.
Lewis Peter Tier, ...Norwalk, O.
Frank Conway Tomlinson, ...Ironton, O.

FRANK WILLIAM WARTHORST, ...Birkenfeldt, Germany.
CHARLES WILLARD WASSON, ...Friendship.

BACHELOR OF MECHANICAL ENGINEERING (1).

WILLIAM NACE SMITH, ...Canajoharie.

SECOND DEGREES.

MASTERS OF SCIENCE (2).

ORVILLE ADELBERT DERBY, B. S.
LOREN PEASE SMITH, B. AGR.

CIVIL ENGINEERS (4).

OLIVER HAZZARD PERRY CORNELL.
GEORGE WHITFIELD FARNHAM, B. C. E.
EDWARD WYLLYS HYDE, B. C. E.
GEORGE LA TOUR SMITH, B. C. E.

DOCTOR OF PHILOSOPHY (1).

FREDERIC WILLIAM KELLEY, M. A.

LICENTIATES.

ROBERT GEORGE EVENDEN, in Surveying,............Vernon.
EDWARD HAYES, " ....Cohoes.
FERDINAND JOHN KRAMER, " ....Cincinnati, O.

The Certificate of Licentiate in Surveying and Draughting was conferred last September, on

EBEN FREME WELLES, ...Brattleboro, Vt.

PRIZES AWARDED.

The following is a list of Prizes awarded in the University during the sixth academic year—1873–4:—*

WOODFORD PRIZE.

JAMES FRASER CLUCK, a Gold Medal of one hundred dollars.

* The award of the Woodford Prize, 1873, was afterwards reconsidered and the money refunded.

FOUNDER'S PRIZES.

IN AGRICULTURE.

W. R. LAZENBY, fifty dollars.

MECHANIC ARTS.

1st Prize—J. S. WATERMAN, fifty dollars.
2d Prize—A. R. GILLIS, thirty dollars.
3d Prize—A. B. MCNAIRY.

PRESIDENT'S PRIZES.

In English Literature—GEO. R. FITCH, thirty dollars.

[No second prize awarded.]

Physiology—C. B. COON, thirty dollars.
W. E. DENNIS, twenty dollars.
W. E. YAGER, ten dollars.

EARLY ENGLISH TEXT SOCIETY'S PRIZES.

History and Development of the English Verb.

1st Prize—G. SCHWERDTFEGER.
2d Prize—E. ODSON.

Horace K. White Prizes in Veterinary Science—Two equal prizes to
J. L. STONE and
E. CORSON.

PRIZES FOR UNDERGRADUATES, 1874–5.

No student will be allowed to compete for a prize unless he shall be pursuing the studies of that year in the course to which the subject for the Prize offered belongs; or, unless the majority of his studies are such as to give him rank with the class pursuing the studies of that year.

No student is allowed to be a competitor for any of the following Prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any his required examinations at the close of the term in which the competition takes place.

THE FOUNDER'S PRIZES.

The following prizes are offered by the Founder of the University, the examinations for which are conducted in such manner as the Faculty may direct:—

Fifty Dollars to the student in Agriculture working on the farm, who, without neglecting his other University duties, shall show himself most efficient, practically and scientifically, upon the University farm; *Twenty Dollars* to the second in merit; *Ten Dollars* to the third in merit.

Fifty Dollars to the student in the Mechanic Arts, working in the shop who, without neglecting his other University duties, shall show himself most efficient, practically and scientifically, in the University work-shops; *Twenty Dollars* to the second in merit; *Ten Dollars* to the third in merit

THE PRESIDENT'S PRIZES.

With the view of assisting meritorious students, the President of the University offers the following prizes for the year 1874–5, which are to be awarded by examiners appointed by the Faculties:—

IN HISTORY.—1. *Thirty Dollars* for the best essay or series of notes connected with the President's Course in History; *Twenty Dollars* for the second in merit. 2. *Thirty Dollars* for the best essay or series of notes in connection with Professor Goldwin Smith's Course in English History; *Twenty Dollars* for the second in merit.

IN PHILOSOPHY AND LETTERS.—*Thirty Dollars* for the best English essay; *Twenty Dollars* for the second in merit; *Ten Dollars* for the third in merit. The subjects for the present year are:—

1. The Vernacular Literature of Europe in the Middle Ages in its relations with Romanism.
2. Latin Epistolary Literature.
3. Swift and Dickens as Humorists.
4. The England of the "Canterbury Tales."
5. Wordsworth's Theory of Art as stated by him, and as illustrated by his Poems.
6. Fielding and "George Eliot" as Representative Novelists.

IN THE MECHANIC ARTS.—*Thirty Dollars* to the most meritorious student in Practical Mechanics and Physics; *Twenty Dollars* to the second in merit.

IN NATURAL HISTORY.—*Thirty Dollars* for the most meritorious report or thesis upon an original investigation in Geology; *Twenty Dollars* for the second in merit. 2. *Thirty Dollars* for the best examination in Physiology and Hygiene; *Twenty Dollars* for the second in merit; *Ten Dollars* for the third in merit.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford Prize the present year are as follows:—

1. Nationality in Literature.
2. American Extravagance.
3. "The New Learning" of the 16th Century, and its Leading Representatives.
4. The Element of Repose in Nature, in Art, and in Life.
5. Historical Massacres.
6. England and Ireland.
7. The Modern Novel as an Agent in Social and Moral Reform.
8. Democratic Justice at Athens.

Admission and Duties of Students.

ENTRANCE EXAMINATIONS.

Candidates for admission must be at least sixteen years of age, and if women eighteen, of good character, and possessed of such physical health and strength as will enable them to pursue the studies of the course which they propose to enter.

Persons seeking admission to the University will be required to pass examinations as follows:—All candidates, no matter what may be the course of study they intend to pursue, must pass a thoroughly satisfactory examination in the following subjects:—(1) Geography. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic, and (4) Algebra through Quadratic Equations.

This general examination will admit them to the University as *optional* students, or as students in the Special Courses of Agriculture, Chemistry and Physics.

For the course in ARCHITECTURE, CIVIL ENGINEERING, the MECHANIC ARTS and the GENERAL COURSE IN SCIENCE, besides this general examination, candidates must be further examined in plane geometry.

For the Course in NATURAL HISTORY, besides the general examination described above, they must be examined in six books of Geometry; Plane Trigonometry; Allen's Latin Reader, or some equivalent for it, with an adequate amount of grammatical knowledge; Greek, the alphabet and enough of the language to enable the student to recognize, analyze and form scientific technical terms; Physiology, an acquaintance with the technical terms employed in the science, including the names of all the organs and tissues and general functions.

For the course in LITERATURE and that in PHILOSOPHY, besides the gen-

eral entrance examination, they must be examined in Plane Geometry; in Latin Grammar, including prosody; Composition (Arnold's first twelve chapters); Allen's Reader, or four books of Cæsar's Gallic War; Virgil's Eclogues, Georgics, and six books of the Æneid; six Orations of Cicero.

For the Course in ARTS, or the Classical Course, the examination will be the same as for the Course in Literature, (including the general entrance examinations,) with the addition of an examination in Greek.* Greek Grammar (Goodwin's is preferred); writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; Smith's Smaller History of Greece.

All candidates are advised to make themselves familiar with some good elementary treatise on physiology. The text books recommended are the following:—Dalton's or Jarvis' "Physiology;" Huxley and Youman's "Physiology and Hygiene," omitting chapters XI and XX; Cutter's "Anatomy and Physiology."

NATURE OF THE EXAMINATIONS.

Some idea of the character of the Entrance Examinations may be derived from the specimens of examination papers given below. They are in all cases papers that have actually been given to classes when examined for admission, and are but fair samples of what will be given hereafter. And although perfect answers to all the questions are not indispensable, yet a near approach to perfection is required in all cases. Of the students that have offered themselves for examination in each year, thus far about fifteen per cent. have been rejected on account of insufficient preparation. And of those that are admitted, a large portion are admitted with conditions to be made up during the term, and this inadequacy of preparation proves in many cases so heavy a burden that the students fall out at the end of the first term, and are obliged to wait another year before they can go on. Deficiencies are common in all branches; but perhaps the greatest are the elementary branches, as in English Grammar and Algebra, especially in fractions, exponents and radicals. In the Latin and Greek also they are very great. The one great fault is want of thoroughness and accuracy in the preparatory scholarship.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities,

*Greek is pronounced at the University, according to the system recommended in the preface to Goodwin's Grammar.

must present certificates of honorable dismission, from an advanced standing. They will, on such a testimonial, be admitted to the University without further examinations. The testimonial must certify to both good character and good scholarship. It must show that the student has spent at least *one term* in the institution from which he comes; has passed *satisfactorily* the examinations at the end of the term, or at least that the duties of the term were satisfactorily performed. Such a testimonial will merely admit the bearer to the University; it will not admit him to any particular advanced standing. On this admission he will be allowed to join any class in any study that requires no previous preparation except the general preparation for admission to the University, as for example, French with the Freshman class, German with the Sophomore. But if the student desires to join any advanced class, as the class in Trigonometry, the class in Latin, Greek, advanced French or German, etc., he must apply to the Professor in charge of the department, and undergo such examination as he may require in order to satisfy himself of the student's ability to go on with the class.

Students coming from other colleges or universities, are *in no case* admitted at *once* to any advanced standing as Sophomore, Junior or Senior. The class distinctions indicated by those names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of this University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need, to prepare themselves for graduation here, without regard to the class distinctions above alluded to. And after having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, they may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to,—the Faculty by this act accepting their studies elsewhere as equivalent to what they would have done here if they had entered the University at the beginning of their collegiate course.

DIRECTIONS FOR ADMISSION.

The candidate will first apply to Dr. Wilson, the Registrar, at No. 143 Cascadilla Place.

1. In case he comes from another college or university, with the "Dismissal" above described, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

2. But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations, the times and places of which will then be announced to him.

After his examinations he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing all the examinations required, and showing to the professor his registration ticket.

The days for examination are the Monday, Tuesday, and Wednesday preceding the day on which the instruction for the Fall Term commences, and the Tuesday and Wednesday before the beginning of instruction for the Winter and Spring terms respectively, and the Monday and Tuesday preceding the annual commencement.

Students intending to enter the University should be present, at the latest, by 9 a. m. of the day on which the entrance examinations begin, at each of the four terms of examination included in the Calendar, p. 9.

No student will be examined for admission at any other time, except in cases where very urgent reasons have prevented his being present at the regular entrance examinations.

But in case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examination, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *And no optional or other course will be possible* without some advance beyond the mere entrance examination.

ADMISSION TO AN ADVANCED STANDING.

Students who have prepared themselves for an advanced standing in the University, at academies or public schools, not having entered any other college or university, will be required to pass the entrance examinations. After that they will be in the same relation to their classes as those that have come from other colleges. They will be admitted at first as optional students, and will afterwards pass the examinations for the standing they seek, at the times appointed by the several professors whose classes they propose to enter.

These examinations are required for two classes of cases:

(1) Students, who desire to join an advanced class in any Department, as, for instance, Mathematics, French, German, without intending to graduate, are required, before joining such class, to pass an examination in the studies that have been pursued by that class, in order to test their ability to go on with it.

(5) Students *intending to graduate* in any Course will be required to pass an examination, with the classes in the University, in those studies of the course which they may have pursued elsewhere.

Testimonials from other colleges and institutions of learning will always be taken into respectful consideration, but they will in no case, except when they are in the form of an "honorable dismission" as described above, supersede the necessity for entrance examination here.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate Degree in this University or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular Professor or Special Faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

The Schedule of lectures and exercises for each term is issued at the beginning of the term, and any modifications are published on the University bulletin-board. The day next preceding that on which instruction begins, is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

Regular chapel service is held on all days of University exercises—

Monday, Tuesday, Wednesday, Thursday, Friday—at 8 a. m. Lectures and class exercises commence at 8¼ a. m. and continue until 1¼ p. m. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors. The greater divisions of the day are signaled by the chimes, and the lesser by the great bell of the University—the following being the schedule furnished to the master of the chimes:—6 a. m. Reveille (chimes); 6¾ Breakfast call (great bell); 7¾ Chapel call (chimes); 1¼ p. m. Dinner call (chimes); 4¼ Drill call (chimes); 5¾ Supper call (great bell); and ten strokes on the great bell for each hour of lecture or other exercises.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term. To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is thus required for continuance in the University, or a marked proficiency in some one of the more general departments of study. And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one more in the University, as a registered student.

COMMENCEMENT THESES.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere

boys, assuming no further control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory practice, each week, and that no student shall take an optional course that is not approved by the Faculty as worthy of his time and efforts. Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without eave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty. Any student found guilty of intoxication or other gross immorality will be at once dismissed. And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to reënter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

PAYMENTS TO THE UNIVERSITY.

For State students under the appointment of school commissioners and city boards of education, for students in agriculture and for all resident graduates pursuing post-graduate courses, there is no charge for tuition or use of Library and collections. But for all others the tuition fee is twenty dollars a term. No matriculation or entrance fees are required; nor is any discrimination made between students coming from other States. The fees for instruction must be paid in advance, at the beginning of each term. All students are, moreover, held responsible for any injury done by them to the property of the Institution. Payments to the University, of every kind, are to be made to the Assistant Treasurer at the University office. Parents and guardians are advised to remit the amount of all University bills directly to the Assistant Treasurer.

Each student intending to take laboratory practice in Chemistry must deposit with the Assistant Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

There is a further charge of five dollars for graduating fee to be paid by each student at the time of his taking his first degree.

EXPENSES OF RESIDENCE.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

The following is an approximate estimate of the yearly expenses:—

Fees for instruction, $20.00 a term	$60.00
Room, board, lights and fuel, about	240.00
Total,	300.00

Cascadilla Place, formerly kept by the University as a boarding-house for professors and students, is now rented, to be kept for the same purpose. It is convenient to the University, and board with rooms, fuel, washing, etc., can be had in it at an expense of from five to seven dollars per week.

Other items vary with the student's disposition and habits. Text books and stationery cost from $20 to $30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

Courses of Study.

Figures in parentheses denote the number of exercises per week. The word "or" in italics between two or more studies denotes that they are equivalent for each other and that either of them may be taken at the option of the student.

GENERAL COURSES.

1. COURSE IN SCIENCE.

FIRST YEAR.—*First Term.*—Algebra completed (5); French (5); physiology (3); rhetoric and composition (2). *Second Term.*—Advanced geometry (5); French (5); zoölogy (3); rhetoric and composition (2). *Third Term.*—French (5); German (5); trigonometry (4); rhetoric and composition (2).

SECOND YEAR.—*First Term.*—German (5); French (3); chemistry (4); experimental mechanics (2); elocution (1). *Second Term.*—German (4); French (3); chemistry (2); electricity and magnetism (2); analytical geometry *or* chemical laboratory practice (4); elocution (1). *Third Term.*—German (3); French (2); electricity and magnetism (2); botany (3); calculus *or* chemical laboratory practice (4); elocution (1).

THIRD YEAR.—*First Term.*—Psychology (3); astronomy (5); heat (3); German (3); English literature (1); essays (1). *Second Term.*—Moral philosophy (2); German (3); ancient and early Roman history (5); acoustics and optics (3); English literature (1); essays (1). *Third Term.*—Logic (3); geology (4); acoustics and optics (3); history of the Roman Empire (4); English literature (1); essays (1).

FOURTH YEAR.—*First Term.*—Mediæval history (5); history of philosophy (2); general literature and oratory (3); *specialty* (5). *Second*

Term.—History (5); political economy (3); general literature and oratory (2); *specialty* (5). *Third Term.*—History (5); lectures of non-resident professors; critical analysis of orations with extempore speaking (3); *specialty* (5); preparation for Commencement.

After the completion of the studies of the second year, any student may substitute for any scientific study or for the history in the second and third terms of the third year any other study in any special department of science; the substitution must be made at the beginning of each year and approved by the Faculty. The *specialty* prescribed for the fourth year must be taken during the Senior year in some one department of Science, such as agriculture, architecture, veterinary surgery, agricultural chemistry, general chemistry, mathematics, mechanics, military science, zoölogy, botany, geology, etc.

2. COURSE IN LITERATURE.

FIRST YEAR.—*First Term.*—Algebra (5); Latin (4); physiology (3); rhetoric and composition (2). *Second Term.*—Geometry (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2). *Third Term.*—Trigonometry (4); Latin (4); botany (3); Anglo-Saxon (3).

SECOND YEAR.—*First Term.*—German (5); Anglo-Saxon (3); Latin, physics *or* chemistry (6); elocution (1). *Second Term.*—German (5); French (3); early English (2); Latin, physics *or* chemistry (4); elocution (1). *Third Term.*—German (5); French (5); Latin *or* physics (4); elocution (1).

THIRD YEAR.—*First Term.*—Psychology (3); French (3); Latin *or* modern languages (6); special literature (2); English literature (1); essays (1). *Second Term.*—Moral philosophy (3); history, ancient and early Roman (5); Latin, modern languages *or* physical astronomy (4); special literature (2); English literature (1); essays (1). *Third Term.*—Logic (3); Roman history completed (4); Latin, modern languages *or* geology (4); special literature (2); English literature (1); essays (1).

FOURTH YEAR.— *First Term.*—Mediæval history (5); history of philosophy (2); Latin or modern languages (4); special literature (3); oratory (1). *Second Term.*—History (5); political economy (3); Latin or modern languages (4); special literature (2); English literature and oratory (2). *Third Term.*—History (5); special literature (2); Latin or modern languages (4); extempore speaking (3); attendance upon lectures of non-resident professors; preparation for Commencement.

After the completion of the studies of the second year, students in this course may substitute for any study in the department of Languages and Literature other studies in the same departments; the change must, however, be made at the time of registration for the beginning of the year.

3. COURSE IN PHILOSOPHY.

FIRST YEAR.—*First Term.*—Algebra (5); Latin (4); physiology (3); rhetoric and composition (2). *Second Term.*—Geometry (advanced) (5); Latin (4); zoölogy (3); French (3). *Third Term.*—Trigonometry (4); Latin (4); French (5); rhetoric and composition (2).

SECOND YEAR.—*First Term.*—German (5); French (advanced) (3); chemistry (4); physics (2); elocution (1). *Second Term.*—German (4); French (advanced) (3); chemistry (2); physics (2); analytical geometry *or* chemical laboratory practice (4); elocution (1). *Third Term.*—German (3); French (advanced) (2); physics (2); botany (3); calculus *or* chemical laboratory practice (4); elocution (1).

THIRD YEAR.—*First Term.*—Psychology (3); astronomy (5); science *or* languages (5); essays and English literature (2). *Second Term.*—Moral philosophy (2); ancient and early Roman history (5); science *or* languages (6); essays and English literature (2.) *Third Term.*—Logic (3); geology (4); history of the Roman empire, science *or* languages (6); English literature and essays (2).

FOURTH YEAR.—*First Term.*—Mediæval history (5); history of philosophy (2); general literature and oratory (3); science *or* languages (5). *Second Term.*—History (5); political economy (3); general literature and oratory (2); science *or* languages (5). *Third Term.*—History (5); science *or* languages (3); general literature and oratory (3); lectures of non-resident professors, preparation for Commencement.

4. COURSE IN ARTS.

[*Italics denote elective studies.*]

FIRST YEAR.—*First Term.*—Greek (4); Latin (4); algebra (5); physiology (3). *Second Term.*—Greek (4); Latin (4); geometry (5); rhetoric and composition (2). *Third Term.*—Greek (4); Latin (4); trigonometry and surveying (5); rhetoric and composition (2).

SECOND YEAR.—*First Term.*—Greek (4); Latin (4); rhetoric and elocution (1): *French, German, mathematics, chemistry, physics. Second Term.*—Greek (4); Latin (4): *French, German, ancient and early Roman history, rhetoric and elocution, mathematics, chemistry, physics. Third Term.*—Greek (4); Latin (4): *modern languages, history of the Roman Empire, early English, mathematics, physics, botany, geology.*

THIRD YEAR.—*First Term.*—Psychology (3); essays (1): *Greek, Latin, modern languages, English literature, mediæval history, mathematics, chemistry, physics, mathematical astronomy. Second Term.*—Moral philosophy (2); essays (1): *Greek, Latin, modern languages,*

English literature, mathematics, chemistry, physics, physical astronomy, zoölogy. Third Term.—Logic (3); essays and criticisms (1): *Greek, Latin, modern languages, general literature, English literature, mathematics, physics, botany, geology.*

FOURTH YEAR.—*First Term.*—History of Philosophy (2); general literature (1): *Greek, Latin, modern languages, literature, history, pure mathematics, applied mathematics, physics. Second Term.*—Political economy (3); general literature and modern oratory (1): *Greek, Latin, modern languages, special literature, history, pure mathematics, applied mathematics, physics, zoölogy. Third Term.*—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors: *Greek, Latin, modern languages, history, pure mathematics, applied mathematics, physics, botany, geology.*

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

ADDITIONAL REQUIREMENTS.

In addition to the studies named in each of the foregoing general courses students are required, in order to take the degree to which it leads, to attend lectures on general agriculture, (hitherto delivered by the late John Stanton Gould,) and the lectures on modern history by President White.

SPECIAL COURSES.

I. COURSE IN AGRICULTURE.

THE FULL COURSE OF FOUR YEARS.

FIRST YEAR.—*First Term.*—German (5); plane geometry (5); physiology (3); rhetoric and composition (2). *Second Term.*—Algebra (5); drawing (4); German (5); rhetoric and composition (2). *Third Term.*—Botany (3); drawing (2); German (5); rhetoric and elocution (2); trigonometry (4).

SECOND YEAR.—*First Term.*—Botany, agricultural and economic (3); chemistry (4); German (3); physics (2); rhetoric and elocution. (1); tools (2). *Second Term.*—Chemistry, general (2); chemistry, agricultural (3); German (3); physics (2); rhetoric and elocution (1); vege-

table physiology (or horticulture and arboriculture) (3). *Third Term.*—Botany, practice (4); chemistry, agricultural, lectures (3); practice (8); physics (2); level, transit and compass (3); rhetoric and elocution (1).

THIRD YEAR.—*First Term.*—Botany, practice (6); chemistry, agricultural, lectures (3); practice (6); physics (3); veterinary anatomy and physiology (5). *Second Term.*—Agricultural chemistry, practice (6); horticulture and arboriculture (or vegetable physiology) (3); veterinary medicine and surgery (5). *Third Term.*—Botany, practice (6); building materials and construction (2); entomology (2); geology (4); veterinary medicine and surgery (5).

FOURTH YEAR.—*First Term.*—Agriculture, lectures (5); practice (6); entomology (1); geology, practice, (6); history (5). *Second Term.*—Agriculture, lectures (5); practice (6); history (5); political economy (3); rural architecture (1); strength and preservation of materials (2). *Third Term.*—Agriculture, lectures (5); practice (6); constitutional and municipal law (1); history (5); thesis for graduation.

A COURSE OF THREE YEARS.

FIRST YEAR.—*First Term.*—Agricultural chemistry, recitations (2); practice (6); algebra completed (5); physiology (3); rhetoric and composition (2). *Second Term.*—Agricultural chemistry, lectures (3); practice (6); drawing (8); geometry (4); rhetoric and composition (2). *Third Term.*—Agricultural chemistry, lectures (3); practice (4); botany (3); entomology (2); rhetoric and elocution (2); trigonometry (4).

SECOND YEAR,—*First Term.*—Agricultural chemistry, lectures (3); practice (4); botany, agricultural and economic (3); physics (2); veterinary anatomy and physiology (5); entomology (1). *Second Term.*—Agricultural chemistry, practice (12); physics (2); vegetable physiology (or horticulture and arboriculture) (3); veterinary medicine and surgery (5). *Third Term.*—Geology (4); botany, practice (4); building materials and construction (2); physics (2); veterinary medicine and surgery (5).

THIRD YEAR.—*First Term.*—Agriculture; lectures (5); practice (6); botany, practice (6); geology, practice (6); tools (2). *Second Term.*—Agriculture, lectures (5); practice (6); horticulture and arboriculture (or vegetable physiology) (3); political economy (3); rural architecture (1); strength and preservation of materials (2). *Third Term.*—Agriculture, lectures (5); practice (6); botany, practice (6); level, transit and compass (3): constitutional and municipal law (1).

2. COURSE IN ARCHITECTURE.

FIRST YEAR.—*First Term.*—Algebra (5); French *or* German (5); rhetoric (2); hygiene, six lectures; free-hand and linear drawing. *Second*

Term.—Advanced geometry (5); French *or* German (5); rhetoric (2); free-hand drawing; projection and tinting. *Third Term.*—Trigonometry (4); descriptive geometry (3); French *or* German (5); rhetoric (2); isometrical projection and shading.

SECOND YEAR.—*First Term.*—Analytical geometry (5); descriptive geometry (4); French *or* German (3); chemistry (2); physics (2). *Second Term.*—Analytical geometry of three dimensions (2); calculus (3); French *or* German (3); chemistry (2); physics (2); drawing. *Third Term.*—Mechanics (3); lectures on building materials and construction (2); French *or* German (3); calculus (5); physics (2); drawing.

THIRD YEAR.—*First Term.*—Shades, shadows and perspective (3); heat (3); lectures on Egyptian, Greek and Roman architecture (2); drawing. *Second Term.*—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (3); optics and acoustics (3); drawing. *Third Term.*—Botany (3); geology (4); optics and acoustics (3); lectures on Gothic architecture (3); drawing.

FOURTH YEAR.—*First Term.*—Lectures on renaissance architecture (3); lectures on composition and the art of designing (2); drawing. *Second Term.*—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (2); drawing, exercises in designing. *Third Term.*—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc. (5); photography (2); drawing; preparation of thesis.

3. COURSE IN CHEMISTRY AND PHYSICS.

This course is intended to prepare students for the practice of chemistry as a profession, and to fit them, as far as it is possible to do so by school-work, to fill positions as teachers or as analytical chemists; and it is designed particularly to provide such a general knowledge of chemical science, for those who wish to take up the special problems of technical chemistry in manufactories, as will afford a good basis for their subsequent investigations. The course comprises the studies of the first two years in the General Course in science; laboratory practice being substituted for the mathematics. During the third and fourth years, the study of physics, mineralogy, and geology, will be pursued with that of chemistry. The exercises required by the Faculty in the full course will include the repetition of lecture experiments in the laboratories; the preparation of chemical substances; laboratory practice in qualitative and quantitative analysis; the use of the blow-pipe in the determination of minerals and ores; assayings; and organic analysis. Six hours a day of work in the laboratory, with deduction of lecture-hours, is required during the last

two years. The text-books for the class-exercises, in the second year, are Thorpe's "Inorganic Chemistry," and "Thorpe and Minie's Qualitative Analysis and Laboratory practice."

Text-books for Laboratory Practice.—Fresenius' "Qualitative and Quantitative Analysis;" Thorpe's "Quantitative Analysis;" Will's "Chemical Tables;" Elderhorst's "Blow-pipe Chemistry;" Kerl's "Probir-Kunst;" Mohr's "Titrir-Methoden;" Bunsen's "Gas Analysis;" Naquet's "Principles de Chimie."

Books of reference.—Plattner's "Use of the Blow-pipe;" Wöhler's "Mineral Analyse;" Rore's "Chimie analytique," or "Analytische Chemie;" Rivot's "Docimasie;" Gemelin's "Hand-Book of Chemistry;" Kekule's "Organische Chemie."

4. COURSE IN CIVIL ENGINEERING.

FIRST YEAR.—*First Term.*—Algebra (5); French *or* German (5); rhetoric and composition (2); draughting; six lectures on hygiene. *Second Term.*—Advanced geometry (5); French *or* German (5); rhetoric and composition (2); draughting. *Third Term.*—Trigonometry (5); French *or* German (5); rhetoric and composition (2); descriptive geometry (3); linear draughting.

SECOND YEAR.—*First Term.*—Analytical geometry (5); descriptive geometry (4); French *or* German (3); chemistry (2); draughting. *Second Term.*—Calculus (3); analytical geometry of three dimensions (2); French *or* German (3); electricity and magnetism (2); chemistry (2); topography (3). *Third Term.*—Calculus (5); land surveying (3); French *or* German (3); electricity and magnetism (2); botany (3).

THIRD YEAR.—*First Term.*—Calculus (5); machine construction (3); stereotomy (3); heat (3); draughting. *Second Term.*—Higher geodesy (5); mechanics (5); mineralogy (2); acoustics and optics (3); draughting. *Third Term.*—mechanics (5); railroad surveying (5); geology (4); draughting.

FOURTH YEAR.—*First Term.*—Astronomy (5); mechanics (5); stereotomy (5); draughting. *Second Term.*—Mecbanics (5); metallurgy (2); advanced structural geology (2); stone cutting (3); machine shop practice (3); drafting. *Third Term.*—Civil constructions (8); engineering economy (3); architecture (2); draughting; preparation of thesis.

5. COURSE IN MECHANIC ARTS.

FIRST YEAR.—*First Term.*—Algebra (5); French *or* German (5); free-hand drawing and shop practice (7). *Second Term.*—Advanced geometry (5); French *or* German (5); free-hand drawing and shop prac-

tice (7). *Third Term.*—Trigonometry (4); French *or* German (5); linear drawing, projections and shop practice (7).

SECOND YEAR.—*First Term.*—Analytical geometry (5); German *or* French (5) or (3); chemistry (2); experimental mechanics (2); shop practice (3½). *Second Term.*—Calculus (3); Analytical geometry of three dimensions (2); German *or* French (5) or (3); chemistry (2); electricity and magnetism (2); shop practice (3½). *Third Term.*—Calculus (5); German *or* French (5) or (3); electricity and magnetism (2); mechanical drawing (2); shop work (3½).

THIRD YEAR.—*First Term.*—Calculus (5); descriptive geometry (5); heat (3); rhetoric and composition (2); shop practice (3½). *Second Term.*—Acoustics and optics (3); machine construction and drawing (4); principles of mechanism (5); rhetoric and composition (2); shop practice (3½). *Third Term.*—Machine construction and drawing (4); steam-engine (4); mill work (4); shop practice (3½).

FOURTH YEAR.—*First Term.*—Designing machinery (4); machine drawing (4); water wheels, lectures, etc. (4); shop practice (3½). *Second Term.*—Mechanics (5); physical laboratory practice (4); designing machinery (4); shop practice (3½). *Third Term.*—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (4).

6. COURSE IN NATURAL HISTORY.

FIRST YEAR.—*First Term.*—French (5); physiology (3); rhetoric and composition (2); free-hand drawing (3); laboratory work in anatomy (2). *Second Term.*—French (5); zoölogy (3); rhetoric and composition (2); free-hand drawing (3); laboratory work in anatomy (2). *Third Term.*—French (5); German (5); rhetoric and composition (2); botany (3); laboratory work in botany (2).

SECOND YEAR.—*First Term.*—German (5); experimental mechanics (2); chemistry (4); systematic botany (3); laboratory work in botany (2). *Second Term.*—German (4); electricity and magnetism (2); laboratory practice in chemistry (5); vegetable physiology (3); laboratory work in botany (1); laboratory work in comparative anatomy (1). *Third Term.*—German (3); geology (4); laboratory work in botany (5); comparative anatomy (2); laboratory work in comparative anatomy (2).

THIRD YEAR.—*First Term.*—Psychology (3); heat (3); anatomy and physiology of domesticated animals *or* paleontology (5); laboratory work in comparative anatomy (5); essays (1). *Second Term.*—Advanced structural geology (2); laboratory work in geology (5); acoustics *or* analysis of soils (3); medicine and surgery of domesticated animals *or* horticul-

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ture (5); essays (1). *Third Term.*—Entomology (2); laboratory work in entomology (3); optics and photography (5); medicine and surgery of domesticated animals *or* laboratory work in geology (5); essays (1).

FOURTH YEAR.—*First Term.*—History of science (2); astronomy (5); general literature and oratory (3); laboratory work (including thesis) in either botany, geology *or* zoölogy (5). *Second Term.*—Philosophy of history (3); general literature and oratory (2); laboratory work (including thesis) in either botany, geology *or* zoölogy (10). *Third Term.*—Logic (3); general literature and oratory (3); laboratory work (including thesis in either botany, geology *or* zoölogy) (9).

Examination Papers.

ENTRANCE EXAMINATIONS.

The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek, and Latin an oral examination was added to the written one.

ARITHMETIC.

1. Add together 24.6, 35.7 and 80.9; also, add together $1^{yd}\ 2^{ft}\ 8^{in}$ and $2^{ft}\ 7^{in}$; and in each example, EXPLAIN THE REASON FOR "CARRYING."

2. The number 123.456 can be read in 33 different ways, of which the following are specimens: "123, and 456 thousandths;" "1 hundred, 2 tens, 3 units, 4 tenths, 5 hundredths, and 6 thousandths;" "123,456 thousandths;" "12 tens, 34 tenths, and 56 thousandths." Give three more of these ways.

3. Explain in full the REASON why $\frac{2}{3}$ of $\frac{4}{5} = \frac{8}{15}$.

4. Find the greatest common divisor of 238 and 553, and GIVE THE REASONING.

5. $\dfrac{2\frac{1}{2}}{3\frac{1}{3}} + \dfrac{5}{6} + \dfrac{0.001 \times 2200}{0.66 \times 0.2} = ?$

6. What sum, put at simple interest at $7\frac{1}{2}$ per cent. per annum, will amount in $3^{y}\ 4^{m}$ to $2,500?

7. At what price must 5 per cent. bonds be bought, to realize $6\frac{1}{4}$ per cent. interest on the investment?

8. Explain and DEMONSTRATE the rule for cube root; and illustrate by the work for $\sqrt[3]{12,812,904}$.

[*Either of the following questions may be substituted for either of the above.*]

9. How many grammes of distilled water, in a rectangular box 0.2 metres long, 5 centimetres wide, and 50 millimetres deep? How many kilogrammes? How many litres?

10. The locomotive of a passenger train has driving-wheels 20 feet in circumference, but in 121 revolutions, they slip back a distance equal to one circumference. A freight locomotive has drivers $16\frac{1}{2}$ feet in circumference, making 100 revolutions while the drivers of the passenger engine make 121; but in every 33 revolutions they lose one circumference by slipping. When traveling in the same direction, the passenger train gains on the other 10 miles an hour. By how many miles an hour do the trains approach each other, when moving in opposite directions?

ALGEBRA.

1. Multiply $(a - b)$ into $(x - y)$, and EXPLAIN THE REASONS for the signs in your result.

2. What is meant by the third power of a? By the fourth root of a? By $a^{\frac{3}{4}}$? By a^0? By a^{-1}? By $a^{-\frac{3}{4}}$?

3. Why is the square root of a^5 equal to the fifth power of $\sqrt{a}$?

4. Find the Least Common Multiple, and the Highest or Greatest Common Divisor, of $8a^5b^4c^3d^2$, $12b^2c^6d^0$, $30b^3c^5d$, and $10ab^7c^4d^0$. Also of $a^3 + b^3$ and $a^2x + 2abx + b^2x - a^2 + b^2$. EXPLAIN THE REASONS for the rules you have used.

5. Simplify and solve the equations

$$2ax = 2c - (1 - (-c + 1)) + ax - by$$
$$mx + ny = -(p \div (-1)).$$

6. Simplify each term of the following equation, and then find the value of x:

$$\frac{3(2x)^{\frac{1}{2}}(3bx)^0}{(ax)^{-\frac{1}{2}}\sqrt{6a}} + (-2^{ab})^2 = (4^b)^a + \frac{2}{1 + \sqrt{3}} + x.$$

7. Solve the equation $x^2 + 6ax = b$. What conditions must a and b satisfy, in order that the two roots may both be real and positive? Both real and negative? One of each sign? Both imaginary? Equal to each other?

8. State what you can concerning the nature of imaginaries; multiply together $(1 + \sqrt{-1})$ and $(1 - \frac{1}{2}\sqrt{-4})$; and explain.

GEOMETRY.

1. Prove that the angles at the base of an isosceles triangle are equal: and the converse theorem.

2. Prove that if there are two sets of proportional quantities, the products of the corresponding terms are proportional: and the converse.

3. Given two irregular pentagons, construct a pentagon similar to the first and equivalent to the second.

4. Prove that in the same circle, or in equal circles, two angles at the centre have the same ratio as their intercepted arcs. [There are two cases.]

5. Prove that the angle formed by two secants that intersect without the circumference, is measured by half the difference of the intercepted arcs; and demonstrate two of the chief theorems that are used in the proof of this. What analogous propositions are obtained when one or both of the secants are replaced by tangents, or chords, or both? Which of these can you demonstrate as corollaries of the above?

GEOGRAPHY.

1. Name the rivers of Spain, of France, of Germany, of Italy, of Russia in Europe.

2. How could one go by water from Archangel to Constantinople? From Lyons to Paris?

3. Bound Germany, Italy, Turkey in Europe.

4. Name the rivers of India, of China, of Siberia,

5. How could one go by water from Cairo in Egypt to Canton? From Malta to Glasgow?

6. Bound Persia, Arabia, Afghanistan.

7. Over what countries would one pass in going in a straight line from Pekin to Madrid?

8. Name three principal cities in China, three in India, three in Asia Minor.

9. Name five principal rivers of Africa.

10. In what part of Africa are its ranges of Mountains? Describe them.

11. What productions of Africa form articles of commerce?

12. Bound Uruguay, Paraguay, Bolivia.

13. Name five large rivers of South America and say in what direction they flow.

14. Name the capitals of each of the countries of South America.

15. How could one go by water from Montevideo to Pittsburg?

16. Bound Kansas, Arkansas, Dacota.

17. How could one go by water from New York to Chicago.

18. Name five large rivers of British North America.

19. Describe the boundary line between British North America and the United States.

20. What States and countries would one pass in sailing from Milwaukie to San Francisco?

ENGLISH GRAMMAR.

1. State the different ways of forming the plural in English nouns.
2. Give the meaning, formation and derivation of the following words: virtuously, autobiography, hospitable, journalist, circumvolution, disenthrall, inconsequent, interlineation, dissatisfy, quadrennial, worthlessness, contemporaneous.
3. Use the word *iron*, (*a*) as an adjective; (*b*) as an noun; (*c*) as a verb.
4. Use the word *for*, (*a*) as a conjunction; (*b*) as a preposition.
5. Explain the meaning of the terms *person*, *mood*, and *tense*.
6. Parse the italicised words in the following: I know *him as myself: for from our infancy* we have conversed, and *spent* our hours *together.*
7. Define the following terms: *vowel*, *consonant*, *diphthong*, *syllable*.
8. In order to conjugate a verb, what parts must be known?
9. Classify the so-called irregular or strong verbs.
10. Write a sentence in which a phrase or a clause is the subject of a verb.
11. Point out the errors in the following sentences:

(*a*) He laid down in the first place he come to,

(*b*) He has not studied like we did.

(*c*) I had rather go than stay to hear you three persons quarrel with each other.

(*d*) I shan't tell you whom I think is the best man of the two.

(*e*) By no excuse you couldn't justify such conduct.

(*f*) Either in the four first of the class were good scholars.

(*g*) Since you were here, I went out to walk every day.

(*h*) Who did you expect to have seen at the hall?

(*i*) He don't mind me; but I will be sorry to punish him.

(*j*) The third and fifth chapter is very entertaining.

(*k*) The assembly consist of forty-seven members, two elected by nineteen districts, and three by each of the other districts.

(*l*) Scarcely was Elizabeth seated on the throne, when she began to feel the alarming embarrassments of her position.

(*m*) Be prudent; without which you will get into trouble,

12. Turn into grammatical prose the following verses, placing the words in the natural order, and supplying ellipses:

> Meanwhile the south-wind rose, and with black wings
> Wide hovering, all the clouds together drove

From under heaven; the hills to their supply
Vapor, and exhalation dusk and moist,
Sent up amain; and now the thicken'd sky
Like a dark ceiling stood; down rush'd the rain
Impetuous, and continued till the earth
No more was seen; the floating vessel swum
Uplifted, and secure with beaked prow
Rode tilting o'er the waves; all dwellings else
Flood overwhelm'd, and them with all their pomp
Deep under water roll'd; sea covered sea,
Sea without shore, and in their palaces,
Where luxury late reign'd, sea-monsters whelp'd
And stabled; of mankind, so numerous late,
All left, in one small bottom swum imbark'd.

LATIN.

Di, quibus imperium pelagi est, quorum aequora curro,
Vobis laetus ego hoc candentem in litore taurum
Constituam ante aras.

Translate, divide into feet, and give rules for quantities in the first line.

Compare *similis, acer, juvenis, fortis, tenax, diu, male.*

Give all the participles, infinitives and forms of second person singular of *gaudeo* and *fero.*

TRANSLATE INTO LATIN.

1. Are they deserving of praise who have done these things? (No.)
2. He says that he has not many slaves.
3. He has come to ask who commands the army.
4. It cannot be denied that we all lose much time.
5. There were some who promised to remain at Rome.
6. Give these two books to your friend and ask him to set out to-day for Rome.

GREEK.

(N. B.—All the Greek words must be written *with the Accents.*)

I. GRAMMAR.

1. What letters are called *smooth mutes, labial mutes?*—Make the required euphonic change in *συν-γενης, ἰδ-τε, τετριβ-ται.*—Define the terms *perispomenon, metathesis, proclitic,* giving an example of each.

2. Form the gen. and dat. in all numbers of *μοῦσα, ἀνώγεων, πόλις, μήτηρ.*

—Decline ταμίας, πολύς through the sing.; βοῦς, καλλίων through the plural.—Form the gen. and dat. sing. in all genders of τιμάων (giving both the contracted and the uncontracted forms), δούς, λελυκώς.—Compare σεμνός, ὀξύς, σώφρων, καλός, ὀλίγος.—Decline σύ, τίς through the sing. and dual; ὅστις, οὗτος through the plural.

3. Give synopses through all the moods of the aor. mid. and aor. pass. of λύω, and the aor. act. of λείπω; synopsis of the pres. pass. of φιλέω, with inflection of the imperf. pass.; synopses of the pres. act. of τίθημι, and the 2 aor. of ἵστημι, with inflection of the indic. of each.—Give the principal parts of στέλλω, γίγνομαι, φημί, ὁράω, λαμβάνω, φαίνω.

II. COMPOSITION.

1. He came that he might stop this.
   ἔρχομαι. *παύω.*
2. Would that it had not happened!
   γίγνομαι.
3. They said that they intended to write.
   μέλλω. *γράφω.*

TERM EXAMINATIONS—GENERAL COURSES.

I. HISTORY AND POLITICAL SCIENCE.

1. ANCIENT HISTORY—PROFESSOR RUSSEL.

1. Into what races are mankind divided ethnologically?

2. Into what families are the languages of Europe and Asia divided philologically?

3. To what race of mankind do the Chinese belong and to what family does their language belong?

4. About how far back do Chinese records extend?

5. What attention have the Chinese paid to the history of their nation?

6. When did Confucius live? What was the character of his teaching?

7. What nations successively conquered China, and at about what time? Of what nationality is the present ruling race?

8. To what race do the people of Hindoostan belong, and to what family does their language?

9. What attention did the East Indians pay to history? Describe their intellectual character and habits.

10. What have been the prevailing religions of the East Indians? State their doctrines.

11. By what nations has Hindoostan been successively conquered?
12. Of what race were the Babylonians?
13. How far back can we trace Babylonian history?
14. Of what nationality were the Assyrians?
15. What memorials of Babylonian and Assyrian history remain?
16. Describe Assyrian civilization.
17. By what nation were Babylon and Assyria conquered?
18. What was the extent of the Persian monarchy under Darius Hystaspis?
19. How far back does our knowledge of Egypt extend? To what races did the Egyptians belong?
20. What means have we of knowing Egyptian history and civilization? Describe their civilization.
21. By whom were Persia and Egypt finally conquered, and of whose empire did they become a part?
22. To what races did the Hellenes belong? Which were the two principal sub-races?
23. What was the general character of the Spartan goverment? What was the character of the Athenian government? Explain as to each.

2. ROMAN HISTORY—PROFESSOR RUSSEL.

I.—1. Who were the original Italians?
2. What other people belonged to the same family?
3. After the Italians came into Italy, into what nations were they divided?

II.—1. At what date does the authentic history of Rome begin?
2. What authority have we for facts said to have occurred before that period?

III.—1. What was a Roman gens? a curia? a century? a tribe?
2. Under what two great divisions were the free inhabitants of Rome classed?
3. What rights had they respectively?
4. What means of obtaining privileges did the unprivileged class several times use?

IV.—1. What principle in regard to the possession of land is conspicuous in Roman history?
2. How did the small proprietors of land lose it?
3. What was the effect on the prosperity of Rome, of the want of small landed proprietors?
4. What was the object of an agrarian law?
5. Who were the Gracchi, and what did they accomplish?

V.—1. What was the prevailing policy of Rome with respect to foreign nations?

2. By what wars did Rome extend her power?

VI.—1. What was the effect of foreign conquest on the prosperity of the Romans?

2. How did it affect their mode of life, their independence, their morality?

VII.—1. In the time of Marius who were Roman citizens?

VIII.—1. What were the original causes of the loss of Roman liberty?

2. Who first destroyed Roman liberty?

3. After him what form of government did Rome need?

4. Between what persons was the struggle for supreme power?

3. HISTORY OF THE ROMAN EMPIRE—PROFESSOR RUSSEL.

1. What were the powers of the Emperor Augustus and of his immediate successors? Whence were those powers derived?

2. After the time of the Antonines, what body virtually appointed the Emperor? What was the origin of that body, and how large was it?

3. What change did Constantine the Great make in the imperial residence and in the constitution of the empire?

4. By whom and when was the empire divided into two parts—the Eastern and the Western? Give the limits of the two parts. What was the effect of that division on the decline of the empire?

5. How and when did the Roman Empire of the West become extinct?

6. To what principal causes was the decline of the Roman empire due?

7. How were the Goths divided? Where did they come from? Where were they when they first appeared in Roman history? What Roman emperor was defeated by them and when? When and under whom did they finally conquer Italy? How long did they keep possession of it?

8. Who were the Franks and where did they live?

9. Who were the Allemanni? Where did they live?

10. Who were the Huns? Describe the effect of their emigrations on the empire?

11. Where did the Vandals come from? Who was their most distinguished leader? Where did they finally settle?

12. Where did the Lombards come from? When and under whom did they conquer Italy? State particularly how Italy was divided between them and the Exarchs.

13. Who was Pepin le Bref? In what way and when did he become king of France? What return did he make for the decision in his favor? What present power rests on this transaction?

14. Who was Mohammed? Give date of the hegira. Give his character, his doctrines and his purpose.

15. What was the origin of the Ottoman empire? What was its extent in Asia? On what occasion did the Ottomans enter Europe?

MEDIÆVAL HISTORY—PROFESSOR RUSSEL.

I.

1. Describe the Celtic character and religion.
2. What was the result of the Roman conquest of Gaul?

II.

1. Whence did the invaders come who conquered the Gallo-Romans? Name the different nations and say where they settled.

III.

1. How many dynasties of French kings have there been?
2. Name them and the period of the duration of each.

IV.

1. How did the first dynasty come to an end?
2. Where was Neustria? Where was Austrasia?

V.

1. Who was the first Carlovingian king?
2. How and when did he become king? Describe the transaction, showing the advantages on both sides.
3. Describe the character of Charlemagne. What became of his kingdom and when?

VI.

1. Describe the territory and the authority of the earlier kings of the third dynasty.
2. By whom were they opposed? Describe the power of these opponents.
3. Which king of France first extended his authority over the whole country?

VII.

1. To what did the bishop of Rome owe his supremacy over the other bishops?
2. What was the foundation of the temporal power of the Popes?
3. What claim did the Popes make in relation to the government of foreign nations? State the foundation of this claim and on what ground it was resisted.

4. Describe the decisive struggle between the Popes and the temporal sovereigns and the result.

VIII.

1. Describe the feudal system.

2. Mention the various services which were due from the vassal to his lord.

3. Describe the mode of life of a feudal baron.

4. What were the good effects of the system?

5. How did the system operate on the lower classes?

6. How did feudalism come to an end?

IX.

1. What attempts were made under the Valois kings to secure popular liberty?

2. Why did they fail?

3. What was the tendency of the monarchy under those kings? Describe the progress of royal power.

MODERN HISTORY—PRESIDENT WHITE.

1. Give some account of Brunelleschi and his connection with the history of Florentine Art.

2. Sketch the cause of the decline of Art after Michael Angelo and Raphael.

3. Give a brief account of the Colloquies of Erasmus. Name some of them. State the resemblances between Erasmus and Voltaire.

4. Give the main features of the struggle between the Obscurantists and Humanists, with an account of the part taken by Pfefferkorn.

5. Give the dates of Charles V's accession to the thrones of Spain and Germany. What was his title as king of Spain?

6. Give a short account of the attempt, made by Charles V on one side and Francis I on the other, to secure the alliance of Henry VIII.

7. What was the League of Schmalkalden? What was the Peace of Passau, and when?

8. State the effect of the war between Charles V and Joseph I on Protestantism in Germany.

9. Give the names of Loyola's principal associates in founding the Order of the Jesuits.

10. State the part taken by Sainez at the Council of Trent.

11. Give the date of the beginning of the Council of Trent. Where is Trent?

12. Describe the connection of Wallenstein with the Thirty Years War.

13. What is Cardinal Richelieu's relation to the history of religious toleration?

14. What struggle was going on in England at the time of the Fronde?

15. Name the two religious Orders founded by St. Vincent de Paul.

16. Name the chief political opponents in Europe of Louis XIV. What were "Les Chambres de la Réunion"?

17. Give the main points in the connection of John Law with the French Government.

FRENCH HISTORY—PRESIDENT WHITE.

1. What is Mignet's remark regarding the transition from the classic literature of the time of Louis XIV to the philosophic literature of the time of Louis XV?

2. Give a general statement regarding Voltaire's life and influence.

3. Give some idea of the method of attacking old institutions in France taken by Montesquieu in the Persian Letters.

4. Give Rousseau's idea of representation in a republic as stated in the treatise on the Social Contract.

5. Name some of the principal Encyclopædists. Why were they so called? What relation do they bear in the history of French thought to Voltaire and Rousseau?

6. What was Jansenism?

7. Who was Maurepas? What were his ideas regarding the formation of the Ministry?

8. State the main agencies through which the American Revolution influenced the French.

9. Up to what period of the French Revolution was this influence exercised and why did it cease?

10. What was the great preliminary question regarding the States General to be decided before the meeting?

11. What as soon as it had met?

12. State Burke's objection to the way the States General was composed and give your own opinion.

POLITICAL ECONONY—PROFESSOR WILSON.

Specimens of sets of questions drawn by lot by each student.

NO. 4.

4. What is utility or intrinsic value? What objects have such value? Has the same article different intrinsic values? How is this?

24. Who are *traders?* What is their relation to each of the two factors of wealth, quantity and value?

44. What has been the law or ratio of increase as between population

and distributive wealth *up to this time*? Is there any reason to suppose that that ratio will ever be different?

64. What is simple barter? Show the advantages of a circulating medium as a labor-saving machine.

84. Explain the use of money as a *machine* for exchange. Why are gold and silver preferable to other metals?

NO. 12.

12. What is *price*, and how does it differ from value? Show the error of Mill's doctrine [B. I. Chap. I. § 3.] that price results only from limitation of supply. Explain $P=V+(d-s)$.

32. In what sense is land a "force of Nature," to what extent a "machine?" Regarded as a machine, what are the "forces" that it utilizes?

52. Show that the rate of wages will increase with the intelligence of the laborers. Does this apply to the educated few only or to the masses as well?

72. State and explain the principal ways in which the cost of transportation and exchange may be diminished.

92. State the difference, in case of loss by the sinking of a ship and such like calamities, between the loss of a sum in coin and that of the same sum in bills (1) to the parties themselves and (2) to the community.

NO. 13.

13. State the three conditions that affect the law of supply and demand as controlling the fluctuations of price.

33. State Ricardo's theory of the origin of Rent and the law that determines its amount. Is it likely that the peculiarities of the condition of England had any influence in suggesting it?

53. Show how the law of supply and demand will distribute laborers among the various trades and callings so as to best supply the demand for commodities.

73. Is the cost of transportation proportioned to the *weight* or the *value* of the article? How will this affect the *higher* manufactures? and how the *lower?*

93. Why is specie payment on demand of the bill holder essential to the safety and welfare of a business community?

NO. 20.

20. Will distributive wealth be large or small in a purely Agricultural country? What difference between a tropical country, and a country in the temperate zone in this respect?

40. What is to prevent the accumulation of all the property in the hands of a few men, in consequence of the facilities which large capital gives for rapid accumulation?

60. What is rent? What is interest? Why make the distinction? What is the ratio of the one to the other? Prove your answer.

70. When does a Tariff become protective, and what are the effects of a Tariff that is above what is needed to make it protective? What, if it is below?

100. What is the ratio of specie to circulation that has been found adequate to solvency in our country? What was it in 1837? In 1857? What occured then? Upon what does this ratio depend? May it be different in different communities?

PHILOSOPHY OF HISTORY—PROFESSOR WILSON.

Specimens of the sets of questions furnished to each student by lot.

NO. 2.

2. What are the three agents that control the causes and results of history? What are the different theories of their relative influence?

22. Why may we not expect any high civilization in extreme latitudes? What is the effect of elevation above sea level on civilization?

42. What influence has intellectual culture on religion with reference to (1) fetichism, (2) polytheism and (3) monotheism?

62. Describe the circumstances of race and physical position that made Athens the place of origin of modern civilization.

NO. 8.

8. Compare the value of the geological and the philological indications as to man's early conditions.

28. What size, in a city, is regarded as most favorable to civilization? What are the *physical* effects of increase beyond this limit?

48. How were the Chinese written characters formed? How do they differ from the polysyllabic words of Indo-European languages?

68. What circumstances, historically, gave the christian religion an advantage over the heathen religions of the time?

NO. 17.

17. By what three means may savages emerge from savagery? When will the necessity for one or another of them arise? What is the result of refusing to accept either of them?

37. What is the relation of the Play-Impulse to ornamentation, and the production of works of art?

57. Describe the process and influence by which the primitive despotisms became limited monarchies?

77. What reasons have we for thinking that the law that has thus far doomed nations to decline and extinction will cease to operate?

NO. 19.

19. Show the analogy between the progress of an individual from birth to manhood and the history of the race?

39. At what period in a nation's history, and under what circumstances, may we expect the highest development of art?

59. What makes "great men?" What is their influence in forming national character? What can you say of their progeny?

79. Is there anything to prevent the unequal distribution of wealth, which has kept the masses in poverty and misery in past ages? What is it, and how is it to operate?

Lectures are also given in this Department on English history and on American constitutional history and law.

II. ANCIENT LANGUAGES.

I. LATIN—PROFESSOR PECK.

I. LIVY—II, 40.

1. Translate:—

Uxor deinde ac liberi amplexi, fletusque ab omni turba mulierum ortus, et comploratio sui patriaeque, fregere tandem virum. Complexus inde suos dimittit, et ipse retro ab urbe castra movit. Abductis deinde legionibus ex agro Romano, invidia rei oppressum perisse tradunt, alii alio leto: apud Fabium, longe antiquissimum auctorem, usque ad senectutem vixisse eundem invenio: refert certe, hanc saepe eum exacta aetate usurpasse vocem, multo miserius seni exsilium esse. Non inviderunt laude sua mulieribus viri Romani: adeo sine obtrectatione gloriae alienae vivebatur: monumento quoque quod esset, templum Fortunae muliebri aedificatum dedicatumque est.

2. Explain grammatically *sui, eundem, laude, mulieribus, monumento, esset.* What does *quoque* here connect? What is the exact force of each tense of the subjunctive in conditional propositions?

3. State and illustrate the modes of forming frequentative, inceptive, causative and desiderative verbs. What are the diminutives of *ager, res, vox, gloria?*

4. Explain fully *fasces, patres conscripti, ductus auspiciumque, prima vigilia, testudo militaris.*

5. Give the legend here referred to. Remark on the importance of the legendary part of Livy's history. What is known of Livy's life?

II. HORACE—ARS POETICA, 158-174.

1. Translate :—

Reddere qui voces jam scit puer et pede certo
Signat humum, gestit paribus colludere, et iram
Colligit ac ponit temere, et mutatur in horas.
Imberbus juvenis, tandem custode remoto,
Gaudet equis canibusque et aprici gramine campi,
Cereus in vitium flecti, monitoribus asper,
Utilium tardus provisor, prodigus aeris,
Sublimis cupidusque et amata relinquere pernix.
Conversis studiis aetas animusque virilis
Quaerit opes et amicitias, inservit honori,
Commisisse cavet quod mox mutare laboret.
Multa senem circumveniunt incommoda, vel quod
Quaerit et inventis miser abstinet ac timet uti,
Vel quod res omnes timide gelideque ministrat,
Dilator, spe longus, iners, avidusque futuri,
Difficilis, querulus, laudator temporis acti
Se puero, castigator censorque minorum.

2. Explain grammatically *Commisisse, laboret, spe, Se.* Allusions in *custode, campi.*

3. Define "Grimm's Law;" state its applications to Latin and English, and give six illustrations from this extract.

4. State and estimate different theories in regard to the purpose of the Ars Poëtica. Give an analysis of the poem.

5. Distinguish the Odes, Epodes, Satires and Epistles of Horace in regard to subject-matter and form.

6. Give a brief biography of Horace.

III. CICERO—BRUTUS, XLVI.

1. Translate :—

Tum Brutus, Quid tu igitur, inquit, tribuis istis externis quasi oratoribus? Quid censes, inquam, nisi idem quod urbanis, praeter unum, quod non est eorum urbanitate quadam quasi colorata oratio? Et Brutus, Qui est, inquit, iste tandem urbanitatis color? Nescio, inquam; tantum esse quendam scio. Id tu, Brute, jam intelliges, cum in Galliam veneris; audies tu quidem etiam verba quaedam non trita Romae; sed haec mutari dediscique possunt; illud est majus, quod in vocibus nostrorum oratorum retinnit quiddam et resonat urbanius. Nec hoc in oratoribus modo apparet, sed etiam in ceteris. Ego memini T. Tincam Placentinum, hominem facetissimum, cum familiari nostro Q. Granio praecone dicacitate certare.

Eon', inquit Brutus, de quo multa Lucilius? Isto ipso; sed Tincam non minus multa ridicule dicentem Granius obruebat nescio quo sapore vernaculo; ut ego jam non mirer, illud Theophrasto accidisse quod dicitur, cum percontaretur ex anicula quadam quanti aliquid venderet et respondisset illa atque addidisset, "*hospes, non pote minoris,*" tulisse eum moleste se non effugere hospitis speciem, cum aetatem ageret Athenis optimeque loqueretur. Omnino, sicut opinor, in nostris est quidam urbanorum, sicut illic Atticorum sonus.

2. Remark on *quasi, urbanitas, color, Lucilius, vernaculus, pote, minoris.*

3. Describe Cicero's five constituent parts of oratory.

4. Give the occasion, scope and an analysis of the Brutus.

5. Characterize the oratory, public career and private life of Cato Major and of Hortensius.

IV. TACITUS—ANNALS, IV, 57.

1. Translate:—

Inter quae diu meditato prolatoque saepius consilio tandem Caesar in Campaniam, specie dedicandi templa apud Capuam Jovi, apud Nolam Augusto, sed certus procul urbe degere. Causam abscessus quamquam secutus plurimos auctorum ad Sejani artes rettuli, quia tamen caede ejus patrata sex postea annos pari secreto conjunxit, plerumque permoveor, num ad ipsum referri verius sit, saevitiam ac libidinem, cum factis promeret, locis occultantem. Erant, qui crederent in senectute corporis quoque habitum pudori fuisse: quippe illi praegracilis et incurva proceritas, nudus capillo vertex, ulcerosa facies ac plerumque medicaminibus interstincta. Et Rhodi secreto vitare coetus, recondere voluptates insuerat. Traditur etiam matris impotentia extrusum, quam dominationis sociam aspernabatur neque depellere poterat, cum dominationem ipsam donum ejus accepisset. Nam dubitaverat Augustus Germanicum, sororis nepotem et cunctis laudatum, rei Romanae imponere; sed precibus uxoris evictus Tiberio Germanicum, sibi Tiberium adscivit; idque Augusta exprobrabat, reposcebat.

2. Point out, in vocabulary and syntax, deviations from the Latinity of Cicero. Explain fully *manipulus, vexillarii, principia castrorum, justitium, majestas, delatores, acta diurna.* Give the limits of the Annals. What portions of the work are lost? Remark on the literary style and historical method of the Annals. Give Tacitus' account of the public character of Tiberius, and discuss the question of its accuracy. Mention some authorities used by Tacitus. Write a succinct biography of Agrippina (Major) and of Sejanus.

V. CATULLUS, XXXI.

1. Translate:—

Paeninsularum, Sirmio, insularumque
Ocelle, quascunque in liquentibus stagnis
Marique vasto fert uterque Neptunus:
Quam te libenter, quamque laetus inviso!
Vix mî ipse credens Thyniam atque Bithynos
Liquisse campos, et videre te in tuto.
O quid solutis est beatius curis?
Cum mens onus reponit, ac peregrino
Labore fessi venimus Larem ad nostrum,
Desideratoque acquiescimus lecto.
Hoc est, quod unum est pro laboribus tantis.
Salve, o venusta Sirmio, atque hero gaude:
Gaudete, vosque Lydiae lacus undae:
Ridete, quidquid est domi cachinnorum.

2. Construct a full commentary on the poem. Explain the metre. Make a metrical scheme for the (Phalaecian) Hendecasyllabic and for the Galliambic verse. Remark on the originality, Latinity and versification of Catullus. Compare him as a poet with Horace, Tibullus and Propertius.

2. GREEK—PROFESSOR FLAGG.

I. THE PANEGYRICUS OF ISOCRATES.

(Adapted to the pages and lines of Felton's edition.)

I. *Page* 11. Comment on *ὡς* (*line* 1): *ἀπό* in *ἀποφέρειν* (3): *ἐκείνων* (9): *σύν* in *συνεπορίσαντο* (13).—Supply the ellipsis with *ὥσπερ* (12).—Explain the construction of *λαβεῖν* (15), comparing that of *εὑρεῖν* (22); of the participles in *ll.* 17, 18, 19, explaining their difference in tense.—What is logically expressed by the relative sentence in *l.* 22? *Translate ll.* 14–25.

II. *Page* 22. Explain the tense of *ἐπῆρχον* (2).—To what word is *ἰδίᾳ* (3) antithetic?—What is to be observed in the arrangement of the sentence from *l.* 2 to *l.* 6?—Comment on *ἄν* (8): *γάρ* (10): *οὖν* (12): *ὅμοροι* (etymology) 16: *τῷ μεταξὺ τῆς χώρας* (18).—*Translate ll.* 9–19.

III. *Page* 49. Give the composition and literal meaning of *ἀναθήμασι* (3) and *ἐνεκωμίασε* (26).—Comment on *καί* (4): *ἅμα . . . καί* (6): *εὖ πάσχωσι* (8): *τήν* (9): *πρίν* (construction) 12: *μύθων* (case) 17.—*Translate ll.* 4–16.

II. PERSIANS OF AESCHYLUS.

I. *vv.* 1–139. Designate the principal divisions of this passage, and state by whom and in what manner each was probably performed. Give

the technical name of the part comprising *vv.* 93–100. What difference in tone is observable between what immediately precedes and what follows this part?—Comment on οἴτε (16): στεῦται (49): ἄκμονες (51): περσέπτολις (65): ἔσσεται (syntax) 121.—Explain the metrical peculiarity of *v.* 32 (*cf.* 152).—*Translate vv.* 12–20 and 101–113.

II. *Translate vv.* 447–464. Explain the mood and tense of ἐκσῴζοίατο (451) and τράποιντο (459). Scan *vv.* 447–448.—*Translate vv.* 739–752, and scan *v.* 741.

III. *vv.* 800–828. Explain the negative particles in *v.* 802. How does Darius say that he arrives at a knowledge of what he narrates in the following lines?—Explain the mood and tense of ἐκχέῃ (826).—Give the date of the historical event referred to in this passage. Show the significance of Δωρίδος (817).

Mention any instance of tragedies with historical subject earlier than the *Persians*. By what means is the present play rendered Panhellenic (not exclusively Athenian) in spirit? How has Aeschylus contrived to give it the usual religious character? In what did the ὕβρις of Xerxes consist?

III. THUCYDIDES—PARTS OF BOOKS I AND II.

I. *Translate I*, 69, *from* καὶ ἐπιστάμεθα *as far as* ἐκράτει.

Expand οἰόμενοι and γνόντες into clauses, and explain the difference of tense. Explain the tense of ἐκράτει.

II. *Translate I*, 76, *from* οὕτως οὐδ' ἡμεῖς *as far as* γεγένηνται.

Account for the change from μή (before ἀνεῖμεν) to οὐ (οὐδ' αὖ). What exceptional construction in the last sentence?

For Brief Historic Comment.

The first organization of the Confederacy of Delos, and its original objects.—The change from ἡγεμονία to ἀρχή.—The chief grounds of complaint against Athens on the part of her allies.—The different policy pursued by Athens and by Sparta regarding allied states.

III. *Translate II*, 41, *as far as* ὑπ' ἀξίων ἄρχεται.

Recapitulate the points referred to in τάδε (*cf.* ξυνελών &c.), and show to what technical part of the oration they belong. For what commonplaces are these remarks substituted, as the orator himself states? What has he said of their appropriateness, and how does he actually apply them in what he finally says?

The policy of Pericles compared with that of Cimon.—The public offices held by Pericles.—The leading characteristics of the period called by preeminence the Periclean age, and the propriety of the appellation.

Point out any illustrations of the author's peculiar style that occur in the above passages. What qualities constitute the especial merits of Thucydides as an historian?

IV. PLATO'S LACHES.

I. 181 A, B. What does ὅτι (before ὀρθοῖς) connect?—ὅτι before οἰκεῖα?—Where is ἀφίεσο formed?—Explain the case of ὅν (σὺ νῦν ἐπαινεῖ): the meaning of καὶ (σὺ δέ).—*Translate from* Εὖ γε *as far as* σοι εἶναι —Characterize Lysimachus from this passage and 180 D, E, etc.

II. *Translate* 192 E, 193 A.—Where is ἐκτήσεται formed?—Explain αὕτη (193).—Where is the proposition antithetic to (εἰδότα) μέν?—What is the fault in Laches' second definition of courage? What was the fault in his former one?

III. 196 C, D. Explain the construction of οἴεται: the force of αὐτὴν (ταύτην τὴν ἐπιστήμην).—*Translate as far as* οὕτως ἔλεγες.—Wherein is the definition of Nicias proved to be faulty? To what important Socratic doctrine does the refutation of it lead?

How may the assumed time of this dialogue be approximately determined? Show the appropriateness of the selection of Nicias and Laches as interlocutors, with reference to their personal traits. How is Socrates represented in comparison with the two generals (see especially 188 C, etc.).

III. MODERN LANGUAGES.

1. FRENCH—PROFESSORS RŒHRIG AND STEBBINS.

Translate the following into French:—

1. The bookseller has good books, and the carpenter has bad ones. Here are two. Which do you desire?

2. I am not satisfied with those which I have read; can you not lend me a better one?

3. There are ten trees in my garden, and fourteen in my brother's, how many have you in yours?

4. I have only two, and I gave them to him, and I can not sell you any.

5. Wine is good for the sick; milk is better for you and me, and water is excellent when one is thirsty.

6. Has the girl any more silk? I need some in order to mend my silk stockings.

7. She bought some this week, but used some in order to mend my hat, and now she has no more.

8. Who asked for my mother to-day? The painter, whom you know, asked if she was at home; I do not know what his name is.

9. It is not suitable for us to go out when it rains, nor to remain at home when it is fine weather.

10. In order to learn French you must study and write many exercises.

11. At what hour did your brother go to bed this evening? We could not speak to him, for he went away too early.

12. Are you General Smith's oldest daughter? No, sir, I am not.

13. Has anything happened to them? We did not see them at church this morning.

14. Why do you not make haste? It is a quarter before nine, and you are to take your little brother to school.

15. I have eaten nothing the whole day, but I am neither hungry nor thirsty.

16. Colonel G. has money and he buys beautiful paper and French engravings. It does not become him to reproach me with my conduct.

17. Those apple-trees are mine, these are my wife's. Whose are the flowers which you are carrying from market.

18. They belong to my shoemaker. He has just bought them this afternoon and now is going to put them in his child's garden.

19. If you have heard of your son, it is important that you write to him and tell him not to marry that girl; he ought not to go near her.

20. I doubt that he goes to England. I do not believe that he has any friends there, and I do not think that one can be without friends in a foreign country.

21. As soon as he had said this, he rose and spoke to them, and said, "Do not injure him, bring him to me, and remember what he did to you when you had few friends and needed brave ones."

22. Whatever I may do, I cannot help laughing when that boy comes near me; the sleeves of his coat are six inches too short, and he wears a white cloth hat and he carries a cotton umbrella.

23. Take care not to loose your purse. I am afraid you have left it in your room, and you must pay your tailor to-morrow seventeen dollars for your half-dozen shirts.

The examinations for the second, third and fourth years in this Department are entirely oral, consequently no specimens of examination papers for those years can be given.

II. GERMAN.

1. GERMAN.—PROFESSORS HEWETT AND MACKOON.

The *Honor Section* will be required to pass examination upon the whole

paper; the other sections upon *three* parts, of which the fourth must be one.

I.

1. Translate from "Das Römische Carneval," from "Nun fangen die Masken an sich zu vermehren," to "indess seine Begleiter sich alle Mühe zu geben schienen ihn zu besänftigen."

2. Parse in full: *ihnen* (3), *ihres* (4), *was* (5), *beruhigenden* (7), *Corso* (8), *sich* (9).

3. What is the object of *treiben?* Explain the use of *der* before *Weiber?*

4. Give a brief history of the German language.

II.

1. Translate from Raumer's "Geschichte der Hohenstaufen," from "Erst als Friedrich die Uebelthäter" to "liess Isaak Schreiben überreichen, deren Fassung und Inhalt von neuem beleidigen musste."

2. State and illustrate Grimm's law.

3. Explain the differences in the English and German forms of the following words: *geben*, in *zurückzugeben* (2), *wäre* (5), *doppelt* (5), *theil*, in *vortheilhaft* (5), *Seiten* (8), *halbe* (8), *dass* (10).

4. Trace the changes in the following words from the earliest forms with which we are acquainted, and give, so far as possible, cognate forms in other languages: *Kaiser* (1), *Markte* (2), *Mönches* (6), *glaubte* (7), *regeln* in *Massregeln* (8), *deutschen* (9), *mit* (10), *Schreiben* (12), *neuen* (13).

III.

1. Translate from Schiller's "Spaziergang" from—

"Deiner heiligen Zeichen, o Wahrheit, hat der Betrug"

to—

"Zu der verlassenen Flur kehr' er gerettet zurück!"

2. Explain the formation of derivative nouns, as illustrated in *Wahrheit* (1), *Betrug* (1), *Gefühl* (4), *Gesetzes* (6), *Fülle* (8), *Gebäu* (10), *Verbrechens* (13), *Menschheit* (13).

3. Explain the formation of compound nouns, and give illustrations of the various methods of their formation.

4. Analyze fully the following words, giving the primitive word or root, and the various affixes of derivation and declension, and explain euphonic changes: *Deiner* (1), *heiligen* (1), *angemasst* (2), *köstlichste* (2), *bedürftige* (3), *Verstummen* (4), *kund* (4), *ehernen* (9).

IV.

1. Translate at sight the following:

"Die deutsche Sprache ist eine der ältesten," to "die heutige allge-

meine Schriftsprache unter dem Namen des Hochdeutschen (genauer Neuhochdeutsch genannt)."

2. GOETHE'S ITALIAENISCHE REISE.—PROFESSOR FISKE.

I.

Translate from "Nach Walchensee gelangte ich um halb Fünf." to "Ich musste mich des reichgestickten und wohlbebänderten Kopfschmuckes mit ihr erfreuen."

1. The etymology of *Mädchen* (3), *nie* (12), *augenscheinliches* (16), *Kurfürsten* (17), *eigensinnige* (20), *Gegenstände* (25), *erste* (27), *Messe* (30) and *eröffnete* (35).

2. The force of the prefix in each of the three words *gelangte* (1), *Geschöpf* (7) and *gemacht* (17).

3. Parse fully *Stunde* (2), *könne* (11), *gehe* (30), *anträfe* (31), and *welches* (32).

4. The force of *mir* (last word but one in line 5).

5. Name five prefixes forming separable verbs, and five forming inseparable ones, with examples of each of these prefixes taken from the passage.

II.

Translate from "Nach Tische eilte ich mir erst einen Eindruck des Ganzen zu versichern," to "doch um diesen einigermassen darzustellen, muss ich etwas weiter ausholen."

1. The English cognates of *Tische* (1), *warf* (2), *sichern* (in *versichern*) (2) and *Gasse* (7).

2. Derivation and composition of *Eindruck* (1), *Ansicht* (14), *Bedürfniss* (15) and *darzustellen* (19).

III.

Translate from "Endlich bestiegen wir das Dach der Kirche," to "und setzten unseren Weg nach der Cäcilienkirche fort."

1. English cognates of *Dach* (2), *Gegend* (5), *Nähe* (8) and *Knopf* (10).

2. Parse *Ansehen* (3), *Luft* (10), *unten* (15) and *uns* (17).

IV.

Translate from "Allein alle diese Aussichten werden mir durch des Herzogs Unfall verdunkelt." to "denn das Institut ist zu einer Armseligkeit zusammengeschwunden."

1. Etymology of *Aussichten* (1), *Herzog's* (1), *Briefen* (2), *gleich* (4), *einsam* (7), *Lage* (8), *zurück* (in *zurückzukehren*) (11), *bleiben* (11), *Schicksal* (13) and *beobachtete* (22).

2. English cognates of *Theil* (5), *stärkste* (12), *auch* (13), *Zeit* (14) and *weise* (in *schuppenweise*) (17).

3. Parse *werden verdunkelt* (1 and 2), *die* (2), *am liebsten* (3), *derer* (9), *was* (12), *lernen* (14), *anhängenden* (16), *wer* (17) and *Welt* (20).

V.

1. Write a brief sketch of the life of Göthe, giving the principal dates, his places of residence, and a list of his chief works, with the character of each.

2. What were the names of the leading Weimar poets?

3. Sketch the course pursued by Göthe in his journey from Karlsbad to Venice.

3. GOETHE'S FAUST—PROFESSOR BOYESEN.

1. Translate the passage beginning:

"Du kanntest mich, o kleiner Engel, wieder,"

and ending:

"Begreife nicht was er an mir find't."

2. Give a brief æsthetic analysis of the scene, its characteristics of tone and style, and account for its place and purpose in the drama.

3. State the origin and development of the Faust legend.

4. Describe the character of Margaret and the incidents of Göthe's life which probably suggested the present scene.

5. State briefly the plot of the first part of Faust, Göthe's purpose in writing it, and how the same purpose is recognized and carried out in the second part.

6. Give the most important dates connected with the writing and the successive publications of Faust.

7. Name the scenes of the first part which were written after the publication of the original "Faust Fragment."

8. Give a sketch of Göthe's life, including the principal dates and the names of his most intimate friends and associates among men and women.

9. Give a complete list of Göthe's works, referring each to its proper department of literature.

IV. ANGLO-SAXON AND ENGLISH LITERATURE.

1. ANGLO-SAXON—PROFESSOR CORSON.

Give synopses of case-endings of the three declensions of nouns and of the definite and the indefinite declensions of adjectives. Give the plurals

fisc, *dæg*, *cræft*, *beáh*, *wif*, *sceáp*, *heafod*, *bebód*, *fæt*, *spere*, and the rules they follow. Decline *bóc*, *bróthor*, *burh*, *cú*, *hús*, *mann*, *módor*, *turf*, *sunu*. Decline, definitely and indefinitely, *smæl*, *glæd*, *fæst*, *fæger*, *éce*, *grim*, *hálig*, *heáh*, *hræth*. Compare *strang*, *eald*, *geong*, *sceort*, *sófte*, *heáh*, *yfel*, *mycel*, *lytel*. Decline, as possessive adjective pronouns, the genitives singular, dual, and plural of the personal prououns *ic* and *thú*. Give synopsis of the inflections of strong verbs. Give the parts of the verb that have the same root-vowel. Give the changes the root-vowel of the 1st pers. pres. indic. undergoes in the 2d and 3d pers. when the vowel of the endings *-est* and *-eth* is syncopated, and give the euphonic consonantal changes and omissions which then take place. Conjugate *beorgan*, *yrnan*, *ceósan*, *wesan*, *beón*, *dón*, *willan*, *habban*, *ágan*, *cunnan*, *witan*. Give synopsis of the inflections of weak verbs. State peculiarities of the different classes of weak verbs and the euphonic consonantal changes and omissions which their conjugations present. Explain and give several examples of the use of the dative infinitive.

Read and Translate:

He sǽde thæt nort-manna land wǽre swíthe lang and swíthe smæl. Eal thæt his man oththe ettan oththe erian mæg, thæt lith with thá sǽ and thæt is theáh, on sumum stówum, swíthe clúdig; and licgath wilde móras with áastan, and with upp on emnlange thæm bynum lande. On thǽm mórum eardiath Finnas; and thæt byne land is eásteweard brádost, and symle swá northor swá smælre. Eásteweard hit mæg bión syxtig míla brád, oththe hwene brædre; and middeweard thritig oththe brádre; and northeweard, he cwæth, thær hit smalost wǽre, thæt hit mihte beón threora míla brád tó thæm móre; and se mór syththan, on sumum stówum, swá brád swá man mæg on twám wucum oferféran; and, on sumum stówum, swá brád swá man mæg on syx dagum oferféran.

Construction of "his" in "Eal thæt his man," etc. Analyze "with upp on emnlange." Explain the construction of "symle swá northor swá smælre." What modern English phraseology is derived from the Anglo-Saxon construction like "syxtig míla brád?"

2. CHAUCER—PROFESSOR CORSON.

1. Give the usual noun-declensions of Chaucer's English.

2. How is the definite form of adjectives distinguished from the indefinite. Give examples of the two forms. What definite adjectives are generally used without the distinctive endings? Examples. What is the usual plural form of adjectives? What adjectives usually drop the distinctive plural ending?

3. Give the usual inflections of weak verbs in the Indicative mood,

pres. and past tenses. What verbs end in -*t* in the 3d person sing? Examples of each.

4 How do strong verbs form their past tense and their past paaticiples? Past plural? Examples of each.

5. Give the inflections of the subjunctive mood, pres. and past tenses, sing. and pl.

6. Inflections of the Imperative Mood, sing. and pl.? Give examples. Infinitive endings? Examples. Which of the infinitive endings is most used? What generally determined the use of the other endings?

7. What two participial endings were in use in the English of the XIVth century? Which was generally used by Chaucer, and which by Gower?

8. How are adverbs formed from adjectives? from nouns? What is the usage of the language in regard to the employment of negatives, especially when emphatic? Give examples of the negative united with the verb.

9. In what respect did the accentuation of the English of the XIVth century differ from that of the present English?

10. State the various endings and inflections of the Anglo-Saxon of which the final -*e* of Chaucer's words is a residual or a representative.

11. What are the general rules in regard to the syllabic value of the final -*e* in Chaucer's verse?

12. Scan the following verses, and explain where the final -*e* is sounded, and where it is mute:

V. 38. To telle yow alle the condicioun.
53. Aboven alle naciouns in Pruce.
90. All ful of fresshe floures, white and reede.
102. At that tyme, for him lust ryde soo.
132. In curtesie was sett al hire lestė.
148. But sore wepte sche if oon of hem were deed.
183. And I seide his opinioun was good.
221. Full sweetly herde he confessioun.
235. And certayn he hadde a mery noote.
249. And overal, their eny profyt schulde arise.
311. A Sergeant of Lawe, war and wys.
341. An househaldere, and that a gret, was he.
385. He cowde roste, sethe, broille, and frie,
Make mortreux, and wel bake a pye.
417. He kepte his pacient wondurly wel.
535. And thanne his neighebour right as himselve.
557. His nose-thurles blake were and wyde.
A swerd and a bocler baar he by his side.

567. A gentil Maunciple was ther of a temple.
767. For trewely comfort ne merthe is noon.
823. Ye woot youre forward, and I it you recorde.

3. ENGLISH LITERATURE—PROFESSOR CORSON.

NO. 1.

Each student will receive four or five connected questions, the answers to which are to be embodied in an Essay, written during examination hours. The literary merits of the Essay, as well as the correctness and fulness of the answers given, will be taken into account.

1. Name the chief literary productions of the 14th century that claim the student's special attention.

2. What is the character of the Vision of William concerning Piers the Plowman? In what does its great historic value consist?

3. What dogma of the Church was the special object of Wycliffe's condemnation?

4. What are the literary merits of the Wycliffite versions of the Scriptures?

5. What previous attempts at vernacular translation had been made in England?

6. What influence was exerted by the Wycliffite versions, upon subsequent versions?

7. What noteworthy circumstance in the history of the literatures of Protestant countries, ts connected with the translation of the Scriptures into the vernacular?

8. What qualifications did Chaucer possess for becoming a great national poet?

9. What were the chief obstacles to his continued popularity, after the close of the 14th century?

10. What dramatic advantages has the plan of the Canterbury Tales over that of the Decameron of Boccaccio.

11. How is the literary dearth of the 150 years succeeding the death of Chaucer, to be partially accounted for, and upon what was the best productive mind of the nation during that time chiefly expended?

12. Who were the principal poetical representatives of this period? State what you know about them and their works.

13. What are the claims of the Earl of Surrey to his rank in English literature?

14. What is the character of "The Mirrour for Magistrates"? By whom was it planned and what did he contribute to it?

15. In what grand respect did Spenser differ from his cotemporaries and his immediate successors, especially Shakespeare?

16. Define the terms Classical and Romantic as applied to the two schools of literary art which, in Spenser's time, in England and on the continent, were struggling for the ascendancy.

17. How may the Faerie Queene be characterized in respect to its relations to the two schools of literary art, the Classical and the Romantic?

18. What influence has been exerted by Spenser on English poetry, and in which of the modern poets is his influence most apparent?

19. State the chief distinguishing characteristics of Shakespeare's dramatic art.

20. In what does his great superiority to Jonson in the delineation of character, chiefly consist?

21. Upon what principle does Shakespeare seem to have proceeded in always working upon the basis of a previously existing story or play? And in thus working, how does his genius especially show itself?

NO. 2.

1. Give the four distinct periods into which Milton's authorship may be divided.

2. What were Milton's views as to the qualifications of a great poet?

3. State Macaulay's theory as to the requisites of success in the exercise of poetic genius.

4. What do you understand by a poetic reflection of an age? And why are great poets the truest historians?

5. What is it that makes Milton the great central figure of his age?

6. Compare Dryden with Milton as a reflector of his age.

7. Give an account of "the Collier Controversy."

NO. 3.

1. What was the occasion of Pope's Rape of the Lock? What were Pope's models in its composition?

2. State the relations of the poem to Pope's time.

3. In what form of poetry did the spirit of his age find its best embodiment?

4. Give an account of the Ossian controversy.

5. What good influence was exerted upon English poetry by Bishop Percy's Reliques?

6. State as fully as you can what you consider Cowper's relations to have been to the great revival in English poetry.

7. Trace succinctly the progress of the revival and the opposition it met with up to its culmination in Wordsworth.

4. CRITICAL READING—PROFESSOR CORSON.

MILTON'S LYCIDAS.

Give the occasion of the composition of the poem, and analyze its structure. Explain as minutely as possible the ecclesiastical allegory running through it. In what different senses have the five opening lines been understood? v. 1, force of "yet?" v. 3, "crude," original meaning? What other English word has the same root? v. 6, "sad occasion dear;" give several other examples from Milton of this arrangement of epithets. Explain "dear." Give examples from Shakespeare of this use of the word; Craik's explanation? Horne Tooke's etymology? v. 7, "Compels," why used in the singular? "to disturb your season due?" Explain. v. 8, "Lycidas;" where did Milion get this name for his shepherd, and why did he probably choose it? Etymological meaning of the name? v. 11, "rhyme;" correct etymology of the word? Why was the "h" introduced in the spelling? v. 13, "welter;" etymology of word? What other English verbs have the same root? "to," force of? Give other examples from the poem, of this use of the word. In what present English phrases is it still so used? v. 14, "melodious tear," explain. v. 20, "lucky words;" explain the epithet. v. 22, "sable shrowd," explain; etymology of "shrowd?" v. 23, *et seq.*, explain biographical allusion. v. 33, "oaten;" what form have adjectives in -en given place to in present English? What change in meaning have those that are retained, undergone? v. 38, "must," force of? v. 47, "wardrop," what is the usual order of the elements of a compound word? How is the order in "wardrobe" accounted for? v. 49, "such," force of? v. 55, "wisard," propriety of the epithet? original force of -ard? usual present force? Give other examples. In what word has it been corrupted? v. 59, "inchanting," explain the epithet. v. 61, "the," force of? v. 64, "boots," etymology of word? "uncessant." What is the present rule in regard to the use of un- and in-? v. 64–69, explain the allusion. v. 67, "use," modern use? v. 75, "Fury," how does the poet use the word here? v. 76, "life," what figure? v. 79, "in the glistering foil," construe. v. 81, "by," force of? v. 82, "perfet," explain the form. v. 85, "honour'd," explain the epithet. vv. 87, 88, explain. v. 90, "in Neptune's plea," explain. v. 93, "every," etymologically = what? difference between the uses of "each" and "every:" v. 97, "was stray'd," what distinction was formerly observed in the use of *be* and *have* as auxiliaries? Difference between "is come" and "has come?" v. 101, "th' eclipse," force of "the?" "with," force of? v. 103, "went," what would be used in present English? Derivation and original sense of "went?" v. 104, what

is the allusion? v. 106, "Like," construe. v. 110, "twain," three uses of, in Elizabethan English? v. 111, "amain," etymology, and force of the word here? v. 112, "bespake," give other examples from Milton of this use of the word; what force has be- in present English? v. 114, "Anow" difference, originally, between the use of "enow" and "enough?" v. 119, "Blind mouthes!" Is Hale's explanation acceptable? What other explanation would make the expression more poetic? v. 120, "the least," construe. v. 121, "faithfull," what has probably caused the dropping of one l in present spelling? v. 123, "list," its derivation and earlier use? In what word does it survive? And to what other word is it akin? v. 126, "draw," in what form is the word still used in this sense? v. 129, "and nothing sed," explain construction of this phrase. vv. 130, 131, to what are these two lines generally understood to allude? but what is their more probable meaning? vv. 132, 133, "Return, Alpheus,....return, Sicilian Muse," explain. v. 134, "bid them hither cast," what is involved in "hither?" v. 138, "swart star," force of epithet? v. 140, "quaint," etymology, and force of here? v. 142, "rathe," what form of this word is still in use? What other form is found in Shakespeare and earlier writers? Where has Tennyson used "rathe?" v. 149, "his;" give history of the present neuter genitive "its." v. 151, "laureat herse," explain "herse," and give examples of its earlier use; explain the epithet. v. 152, "so," force of? v. 158, "monstrous"=what? v. 159, "moist vows," develop; v. 160, "fable of Bellerus old," what rhetorical figure? vv. 161–163, explain the ecclesiastical meaning of these lines; "ruth," in what modern English word does it survive? in what verb? explain the form. v. 166, "your sorrow," what rhetorical figure? Give examples of other abstract nouns used in a concrete sense; examples from the Latin and Greek; v. 173, "that walk'd the waves," after what class of intransitive verbs was it common in Elizabethan English to omit the preposition? Give examples from Shakespeare. What difference in meaning is there in "walk'd the waves" and "walk'd on" or "walk'd o'er the waves?" Which is the more poetic, and why? v. 176, "unexpressive," explain the use of adjectives in -ive and -ible, in Elizabethan English, and give examples, from Shakespeare, of such adjectives used in a passive and in an active sense; v. 184, "thy," personal, or possessive adjective pronoun? "good," force of? Any like use in modern English? v. 185, "that wander in that perilous flood," what force has "in" here, different from what "on" or "o'er" would have? v. 186, "uncouth," radical and derivative meanings? meaning here? v. 189, "thought," force of? "Dorick," explain the epithet; v. 190, "stretch'd out all the hills," explain; what equivalent expression in Virgil's Eclogues? v. 192, "twitch'd," explain; "blew," why this epithet? v. 193, explain this verse.

V. MATHEMATICS.

1. ALGEBRA—PROFESSORS BYERLY AND WAIT.

1. Find all the commensurable roots and one incommensurable root of the equation $x^5 - 4x^4 + 13x^3 - 47x^2 + 80x - 44 = 0$.

2. Find a formula for the sum of n terms of an arithmetical progression by making it depend on the $(n + 1)$st term of a new series, and show that your formula is identical with the one found by the usual process.

3. Find the logarithm of 8608; interpolating in your table by the aid of the formula for the $(n + 1)$st term of a series.

4. Develop $\sqrt{1 + x}$ into a series by the binomial theorem, and also by the method of undetermined coefficients.

5. Compute the logarithm of .002, to the fourth approximation, by the method of continued fractions.

6. Calculate by logarithms the value of the expression

$$\sqrt[10]{\left[\frac{(4.275)^3 \times \sqrt[4]{26.41} \times 0.0832}{0.09628 \times \sqrt{\frac{623}{1788}}}\right]^7}.$$

2. TRIGONOMETRY—PROFESSORS ARNOLD AND WAIT.

1. Define the six principal trigonometric functions of ϑ, as *ratios;* and extend the definitions to the case of angles $<0^\circ$ and $>90^\circ$. Find eight fundamental relations among them, *for all values of* ϑ. Obtain $\sin \vartheta$ in terms of $\tan \vartheta$.

Show what lines, drawn to a circle whose radius $= 1$, have the same values as the trigonometric functions or ratios. In what sense can a line and a ratio be said to have the same value?

Write out the six functious of $-\vartheta$, $\frac{1}{2}\pi \mp \vartheta$, $\pi \mp \vartheta$, $\frac{3}{2}\pi \mp \vartheta$, $2\pi \mp \vartheta$, $-5\pi \mp \vartheta$, in terms of those functions of ϑ which express them most simply. What relation has this problem to the mode of using trigonometric tables?

Give the six functions, also versin, coversin and suversin, of the following angles: 0°, 90°, 120°, 225°.

2. Write formulæ for $\sin(\alpha \pm \beta)$ and $\cos(\alpha \pm \beta)$. How do you know that these formulæ are true even when α and β are not between 0° and 90°? Illustrate by the case of $\sin(\alpha + \beta)$.

Proceeding from these, find formulæ for $\tan \frac{1}{2}\vartheta$ and for $\dfrac{\sin\gamma + \sin\delta}{\sin\gamma - \sin\delta}$.

3. In quadrilateral $ABCD$, let $AB = 80$, $BC = 70$, $CD = 60$, $DA =$

50, $AC = 40$; and find BD. Use four-place logarithms; and estimate, roughly, the degree of accuracy in your result.

4. State Napier's rules for spherical right triangles; and demonstrate, using Evans's method.

5. Find, in nautical miles, the length of the shortest path from a point off Cape Horn, in 57° S. lat. and 67° W. long., to a point in 43° 15′ S., 147° 30′ E. off Hobarton. In sailing upon this track, how must I steer at first?

3. PLANE ANALYTIC GEOMETRY—PROFESSOR BYERLY.

1. The centre of gravity of two heavy points is known to divide internally the line that joins them, in the inverse ratio of their weights. Let the points P_1, P_2, P_3 have the weights m_1, m_2, m_3; and let the point P_{23}, at the centre of gravity of P_2 and P_3, have the weight $m_2 + m_3$, and similarly with P_{31} and P_{12}. Prove that P_1 and P_{23} have the same centre of gravity as P_2 and P_{31}, or as P_3 and P_{12}.

What properties of plane triangles can you deduce from this; and what theorems concerning centres of gravity for many bodies?

2. Rectangular equations of two lines; the first containing point $(-2, 3)$ and making the angle $-45°$ with axis OX; the second, containing points $(2, 3)$ and $(-4, -6)$.

Distance of each line from the origin; intercepts on the axes; distance of the lines' intersection from point $(1, 1)$; tangent of their angle of inclination.

Transform the lines' equations to oblique coordinates whose axes make angles $+30°$ and $+60°$ with OX, and whose origin is $(1, 1)$; also to polar coordinates whose origin and axis are O and OX.

Rectangular and polar equations of the circle that contains points $(0, 0)$, $(1, 7)$, $(7, -1)$. Show when its radius vector becomes negative, and interpret this result.

4. Prove that the tangent at any point of an ellipse or hyperbola is equally inclined to the two lines from that point to the foci. What is the corresponding theorem for the parabola, and why?

5. Prove that every equation of the second degree represents an ellipse, a parabola, a hyperbola or right lines.

6. Through a fixed point O passes a moving line that cuts a given hyperbola in points P', P''. Find locus of that point P on the line, which divides $P'P''$ harmonically with respect to O.

4. SOLID ANALYTIC GEOMETRY—PROFESSOR OLIVER.

1. Find, by projections, the cosine of the angle between two lines, in terms of the lines' direction-cosines.

2. Write the equation of the plane, in four of the most important and dissimilar forms; interpret each, and show whether it extends to oblique coordinates, and how obtained.

3. Find the shortest distance between two non-intersecting diagonals of adjacent faces of a given cube.

4. Locus of equations $U = V = W = 0$; of $U = VW = 0$; of $U + k.V = 0$; of $UV + mUW + nVW = 0$; where $U = 0$, $V = 0$, $W = 0$ represent any surfaces.

5. Classify the surfaces $Ax^2 + By^2 + Cz^2 + 2Lx + 2My + 2Nz = 0$, by referring to new coordinate axes so as to simplify their equations.

5. DESCRIPTIVE GEOMETRY.

1. What is a warped surface?

2. Given three right lines not parallel to the same plane, and another right line moving on these as directrices; what is the surface generated? Find the tangent plane at a point of one of the directrices.

3. What is a developable helicoid, and why is it developable?

4. Given a right line, a cone, and a cycloid as directrices of a warped surface; construct an element.

5. Given three right lines perpendicular to another right line, no two of which are in the same plane; what is the surface generated by a right line moving on the first three?

6. Find the axis of a hyperbolic paraboloid situated in a general position with reference to the planes of projection.

7. Given the references of three points; $4\frac{4}{5}$, $2\frac{1}{2}$, $2\frac{3}{10}$; pass a plane through them, and find its angle and scale of declivity.

8. Construct a railroad curve on a grade, and determine the nature of the contour lines and surface of the embankment and road bed.

9. Find the brilliant point of the vertical projection of an oblate ellipsoid; rays parallel.

10. Construct the skew arch soffit and find the tangent plane at a given point of the surface.

6. CALCULUS—PROFESSOR BYERLY.

ONE-TERM COURSE.

1. Define Curvature, Osculating Circle, Radius of Curvature, Centre of

Curvature, Evolute. What are the two most important properties of the evolute of any curve?

2. Find the length of the radius of curvature of the curve $x^2 = 4y$ at the point whose abscissa is 2.

3. Find at what point of the curve $x^2 = 4y$ the radius of curvature will be a minimum.

4. Give the reasoning in full of the method of determining by integration the centre of gravity of a parabolic segment.

Example.—Find the coordinates of the centre of gravity of the segment of the parabola $y^2 = 2mx$ cut off by the double ordinate through (x_1, y_1).

7. CALCULUS—PROFESSOR OLIVER.

FULL COURSE, EXTENDING THROUGH THREE TERMS.

1. Explain the terms "limit," "infinitesimal," "order of infinity," "derivative," "differential" or "virtual increment," "difference" or "increment."

Compare the method of limits, that of infinitesimals, and Lagrange's; and show that all three are rigorous.

Show that integration, defined as a certain limiting case of summation, is the inverse of differentiation. Explain its relation to the arbitrary or undetermined constant, and the theory of definite integrals.

Likewise illustrate all the above topics by aid of a curve, or of a moving point.

2. Show that $\lim\,(1 + i)^{\frac{x}{i}}$ can, by assigning a suitable law to the infinitesimal i, be developed by the binomial theorem for positive integer exponents; and that it converges.

Obtain the derivative of ϵ^x; of $\log x$.

3. Differentiate $\sin^{-1}\dfrac{a + b\sin 3\sqrt{x}}{b + a\sin 3\sqrt{x}}$.

4. Express $D_x{}^3y$ in terms of derivatives of x with respect to y.

5. Write Taylor's Theorem in two forms. Develop $\sin x$ and $\cos x$. Obtain De Moivre's formulæ, and describe the six hyperbolic functions.

6. Investigate the conditions for a maximum or minimum in a function of two variables. Apply to the function $xy(1 - 2x - 3y)$.

7. Prove that at any point of a surface the sum of the curvatures of mutually perpendicular normal sections is constant.

8. Integrate $\dfrac{dx}{a^2 - x^2}$ into both logarithmic and hyperbolic forms.

Obtain the integral $\int \frac{dx}{x} = \log x + C$ from the general form of $\int x^m dx$

9\. Integrate $\frac{2 + 3x}{(x^2 - x + 1)^2} dx$.

10\. Show how to integrate every rational function of x and $\sqrt{(ax^2 + bx + c)}$, by introducing an auxiliary angle.

11\. Show when $x^m(a + bx^n)^p dx$ is integrable. Explain the methods of reduction by which either m or p can be increased or diminished.

12\. Integrate $(ax + by + c)dx + (a_1x + b_1y + c_1)dy = 0$.

13\. Obtain the singular solution of equation $a^2(dy^2 + dx^2) = (ydx - xdy)^2$; and explain the relation of singular solutions to envelopes.

14\. Find the orthogonal trajectories of the system of circles with a common chord, $y^2 + x^2 - 2ax = b^2$; where a varies.

8. HARMONOID GEOMETRY—PROFESSOR OLIVER.

(Use symmetric methods by preference.)

1\. By theory of permutations, how many essentially different harmonoid ratios are determined by four given elements? Show that each of these ratios fixes all the others unambiguously; and utilize this in defining homography.

Show that either harmonoid of a pencil, if defined by the aid of the sines of the angles, is independent of the choice of positive direction on either ray; and that the above discussion applies to such harmonoids.

Prove that a pencil of $2n$ rays cuts any transversal homographically. Resulting theorem for two pencils or ranges, and its converse. Cases where one intersection is at infinity, and where two corresponding elements are identical. Methods of completing a pencil or range homographically to another.

2\. Distinguish descriptive from metric relations. What classes of either are projective, and why?

Prove that any four tangents to a conic meet any fifth tangent in a range homographic to the pencil of rays that join the four points of contact to any fifth point on the curve.

3\. Obtain and reciprocate Pascal's theorem.

Given five points on a conic, draw a tangent at either; also find where the conic meets a given line through either point. Reciprocate these problems.

Through a given point, draw a line to the unseen intersection of two given lines.

4\. Establish the fundamental theorems of involution by Evans's method. from the properties of the completed quadrilateral.

VI. NATURAL HISTORY.

1. PHYSIOLOGY—PROFESSOR WILDER.

1. State the chemical resemblances and differences between butter and sugar.
2. State the general object of digestion.
3. What is the internal, mechanical, nutritive function?
4. Define tidal air and state its average amount.
5. Make a diagram of gray and white nervous tissue; state where they occur and their properties.
6. State the difference between plasma and serum.
7. Give a diagram of both sides of the heart; indicate the source, nature and destination of the blood currents.
8. Give a diagram of the hepatic circulation; indicate the source, nature and distribution of the blood, and the changes produced by the liver.
9. State the difference between coma and syncope, and indicate their treatment.
10. Name three common clothing stuffs in the order of their protection against cold.
11. Give a diagram of a vertical section of the skin.
12. State the effect of irritating the anterior root of a spinal nerve *inside* of a section through it.
13. State the effect of cutting through the right half of the spinal cord in the dorsal region.
14. Give a diagram of the tympanum and its contents.
15. State the structure, position and properties of the "blind" and "yellow" spots.

2. PHYSIOLOGICAL BOTANY—PROFESSOR PRENTISS.

1. What are the essential characters of a typical flower?
2. Explain the theoretical structure of the pistil.
3. Distinguish between free and distinct, cohesion and adhesion, pinnate and pinnatifid.
4. Explain the structure of a flower of Compositæ.
5. In what plant is the greatest amount of pollen secreted? Why?
6. What is assimilation? Where and under what conditions does it take place?
7. Show that a flower is homologous with a branch.
8. State some of the distinguishing characteristics between Trillium grandiflorum and T. erectum.

9. Mention ten trees indigenous to New York, and state the Natural Order to which each belongs.

10. What change in structure would convert a raceme into a corymb ?

11. State the leading botanical characters of each of the following orders : Rosaceæ, Leguminosæ, Crucifera, Ranunculaceæ.

12. Define Genus, Species, Order. State the origin of generic, specific, and ordinal names.

13. Draw diagrams to show : 1. Ovary free. 2. Ovary adherent 3. Excurrent stem. 4. Versatile anther. 5. Introse anther. 6. Imbricate æstivation. 7. Valvate do. 8. A petiolate, ovate, cordate, serrate leaf with stipules.

14. Characterize the different kinds of plant tissue.

15. Name six natural orders largely represented in the flora of Ithaca.

16. What are four of the most important orders in temperate regions in regard to their useful products.

17. Explain some structural provisions in plants which aid in their dissemination.

18. What substances constitute the principal food of plants ?

19. Describe the different shapes of monopetalous corollas.

20. Explain the terms diœcious and monœcious.

21. Give examples of common diœcious plants.

22. How do ordinary tendrils act ?

23. Of what advantage is it to a plant to climb ?

24. Explain the general structure of a leaf.

3. ZOOLOGY—PROFESSOR WILDER AND MR. COMSTOCK.

1. What kinds of groups are usually admitted among animals ?
2. Characterize the Vertebrates.
3. Contrast Mammals and Birds.
4. Contrast Marsupials with ordinary Mammals.
5. Contrast Reptiles and Batrachians.
6. Describe and figure the development of a frog.
7. Contrast the Teleostei (bony fishes) with the Selachians and Ganoids.
8. State grounds for regarding the skates as higher than the sharks.
9. Give a longitudinal vertical section of the head of a lamprey.
10. Give a longitudinal section of *Amphioxus*.
11. Characterize the Articulates.
12. Name and characterize (with examples) the usually recognized classes of Articulates.
13. Name the other classes now included by some among Articulates.
14. Give a longitudinal vertical section of a lobster.

15. Name and characterize the orders of Insects.
16. Name and characterize the suborders of Hexapod insects.
17. Describe the metamorphosis of a butterfly.
18. Figure the nets of *Eperia*, *Nephila* and *Hyptiotes*.
19. Figure and describe the cocoon of *Epeira riparia*.
20. What spiders are poisonous ?
21. Give a diagram of *Limulus*.
22. Give a diagram of a Trilobite.
23. Where were the barnacles formerly placed.
24. Give a cross-section of a clam.
25. Give a diagram of a snail.
26. Give a diagram of a cuttle-fish.
27. Name and characterize the classes of Radiates.
28. Name and characterize the orders of Echinoderms.
29. Give a diagram of a sponge.
30. Diagram of an *Amoeba* and a *Moner*, and describe their modes of nutrition and reproduction.

4. GEOLOGY—PROFESSOR HARTT.

1. What is the scope of the science of Geology ?
2. Describe quartz, feldspar, mica, hornblende, talc, serpentine, calcite, gypsum, graphite, pyrites.
3. In how many different ways may limestone be formed ?
4. Define fossil, petrifaction, mould, cast.
5. Name and describe as many kinds of sedimentary rocks as you can.
6. What are gneiss, shale, slate, mica-schist, kaolin, quartzite, dolomite, marl, porphyry, pumice, basalt ?
7. Mud, sand and gravel are thrown by a mountain stream into a quiet lake. In what order will they be deposited ?
8. What are strata, ebb-and-flow structure, ripple-marks, concretions, septaria, cone-in-cone structure ?
9. What are anticlinal and synclinal folds, and anticlinal and synclinal valleys ?
10. Define dip, strike, unconformability of stratification, faults, joints.
11. What are veins and dykes ?
12. Give the subdivisions of geological history as far as Epochs.
13. What is Eozoön ? In what age does it occur ?
14. Suppose you were to find a bed of rock containing species of Paradoxides, Agnostus, Conocoryphe; what would be its age, and what other genera would you expect to find associated with the above ?
15. Name and characterize the principal New York divisions of the Devonian.

16. Describe Productus, Spirifer, Athyris, Strophalosia, Terebratula, Actinocrinus, Pentremites, Phillipsia, Lithostrotion and Palæechinus. What is the vertical range of each genus? Of what period is Lithostrotion mamillare characteristic?

17. What is coal, and how was it formed? Name and describe the principal kinds of coal.

18. Give a sketch of the flora of the Devonian and Carboniferous.

19. Describe the Lackawanna Coal Basin.

20. Name the more important coal fields of North America.

21. What is a coal breaker? How are mines ventilated?

22. Name and characterize the principal subdivisions of Mesozoic time.

23. Give an account of the fossil footprints of the Connecticut Valley, and state under what conditions they were formed.

24. Give, with the aid of diagrams, the leading forms of Cephalopods of the Mesozoic, in their proper chronological order.

25. Describe some of the more remarkable Mesozoic Enaliosaurians. Give a sketch of the reptile life of America during the Mesozoic.

26. What can you say of Mosasaurus?

27. What are Clathropteris retiusculus, Otozoöm Moodii, Estheria minuta, Ceratites nodosus, Gryphæa arcuata, Belemnitella mucronata, Exogyra costata, Hippurites, and Ancylocerus? Of what horizons are they characteristic?

28. Describe the leading geographical changes that took place in North America during the Mesozoic.

29. Name and characterize the principal periods and epochs of the cenozoic of Europe and America.

30. Compare the flora of the Tertiary with that of the Cretaceous in America.

31. Name and describe some of the more important mammals of the Tertiary in America.

32. Describe a glacier. What is drift? State concisely the different theories of its origin.

33. Describe the glacial phenomena observable in the vicinity of Ithaca.

Fire clay, with stigmaria, 2 ft.

Bituminous coal, 3½ ft.

Fine shales, with abundance of fossil plants, 2½ ft.

Sandstones, with very thin coal seams, 45 ft.

Section fails for half a mile, when same beds are exposed; strike as in last section; dip 40° southward.

Section fails for about ⅛ of a mile, when a bed of coarse conglomerate, 165 ft. thick, is exposed; strike N. 32° E.; dip 30—45° southward.

This conglomerate rests unconformably on altered black shales, which continue to end of point; strike N. 45° E.; dip $90^{\circ}\mp$. A glabella of Paradoxides and fragments of Discina and Lingula are found in these shales.

All the above beds extend across the point with unvarying strike and dip.

Discuss above observations, and make geological map and sections.

VII. MORAL AND INTELLECTUAL PHILOSOPHY.

The examinations in this Department are conducted by means of a Syllabus of the lectures on each subject, the questions and topics of the Syllabus are divided into sets, with five or more in a set, one of which is drawn by lot by each student at the time of the examination, and the answers and discussions are written in the presence of the professor. The following are given as examples only two or three from each syllabus:

1. PSYCHOLOGY—PROFESSOR WILSON.

I.

1. What is the relation of the Body to the Mind?

21. What is Materialism in relation to Psychology?

41. What is false perception, and on what conditions may it occur?

61. What are the appetites, and how are they related to the excito-motor emotions?

81. Explain the difference between the æsthetic and the ethic emotions in reference to their origin?

101. What is the difference between volition and choice?

VI.

6. Describe and name the ganglia of the sensorium.

26. Can voluntary action be distinguished from involuntary action by the mere observer? Why not?

46. What are the reasons for regarding the optic thalami as the organ of the sense of touch?

66. How are affections influenced by the voluntary control of thought?

86. What reason is there to suppose that the emotions of self are influenced by difference of physical organization?

106. State the changes in the character of the life of an individual as he passes from infancy to old age?

XIX.

19. What influence have the excito-motor and the sensori-motor emotions upon the character and habits of life?

39. What would be our condition in relation to knowledge of external objects, if we had no sense of touch?

59. Explain the four processes by which nouns as names of things are formed.

79. What are sentiments? and how do they differ from judgments?

99. Why cannot we prove as a matter of fact that animals have volition?

119. What changes take place in the character of memory as we pass from childhood to old age?

2. MORAL PHILOSOPHY.

Each student writes an essay on one of the following topics drawn by lot at the time of writing it.

1. The nature and limit of Moral Action.
2. The influence of theories of Morals on character.
3. The Moral character of Acts as distinct from the Guilt or Innocence of the Agent.
4. Reflex-action in its relation to Freedom of Will.
5. Æsthetic Culture and its relation to Morality.
6. Benevolence as a sentiment and as a Principle.
7. The Duty of Truthfulness and the Extent of its Obligations.
8. The Duty of Justice as between Man and Man.
9. The Rights of the State as against Subjects.
10. Citizenship as a Natural Right.
11. Religion as a Natural Duty.
12. In cases of conflict of Duties, what general rules may be given as our guide in determining what is our Duty?

3. LOGIC.

I.

1. Explain the nature and province of Logic. What are its relations to Psychology?

21. What is the fallacy of Undistributed Middle? When will it occur? Why can there be no Universal Conclusion after a Partial Premise?

41. Explain what is meant by "the presumption," "the probability," and "the certainty of propositions." How many kinds or degrees of certainty are there?

Examples 6, 22, 99.

V.

5. What is synthetic reasoning? Why do we call it *a posteriori?* What are the four relations of things on which it depends?

25. What is a *Sorites?* How may its validity be tested (1) by reduction to syllogisms, (2) by general rules?

45. What are "examples?" what "exceptions?" and their relations to each other? Explain the method and fundamental principle of induction.

Examples 5, 30, 114.

X.

10. When do separable accidents become essential? When essentia and differentia? What is artificial classification, and how does it differ from natural classification?

30. What are disjunctive syllogisms, and the ways of completing them? What is Excluded Middle?

50. Explain the relation of Logic to Rhetoric, and the difference between them in reference to argumentation.

Examples 14, 53, 102.

XV.

15. Explain "immediate inference" by composition (§§ 93, 94.) What is the fundamental law in regard to the force of negatives?

35. What is Ambiguous Middle? Give and analyze an example. How does this differ from undistributed middle?

55. What is the difference between refuting one's *reasoning* and refuting his *conclusion?* How can the former be done? What is the effect of it?

Examples 18, 39, 115.

XX.

20. What is the Fallacy of Negative Premises? Why may there by no conclusion after two Negative Premises? Why no affirmative conclusion after one Negative Premise?

40. May a syllogism be at the same time a fallacy in form and in diction? What is necessary to detect a fallacy in diction? Why?

60. Explain the difference between direct and indirect refutation. What are the three kinds of indirect refutation?

Examples 24, 45, 138.

4. HISTORY AND CRITICISM OF PHILOSOPHY.

V.

5. Describe and define the six classes of nouns: (1) individual, (2) abstract, (3) general, (4) collective, (5) privative, and (6) negative.

25. Give an account of the Sophists; of Socrates; and the origin of the word "philosophy."

45. State Comte's objection to consciousness, as a means of knowledge. What would be the consequence of accepting it?

65. What is meant by the word "*faculty*," as applied to the mind? What influence has the philosophy of Reid had upon this use of words, and the views of the nature of the mind?

85. What is meant by calling God "the Absolute," "the Infinite," etc.? What is the law of the English language, in regard to the use of the article before adjectives? How does it differ from the Greek usage?

X.

10. What is the law with regard to the quality of nouns that may be connected by conjunctions? The reason for it?

30. To what department of Philosophy did Aristotle chiefly devote himself? What was his attitude in regard to Plato's theory of ideas?

50. What is "substance," as distinct from "property"? What are the three significations of the word "substance"?

70. Do we know the mind as object, or as cause only? Explain the difference?

90. What is Cousin's theory of "the origin of the idea" of God? What does he mean by calling God "the Universal Reason"? What inference may we draw from this, as to the nature of God?

XVII.

1. State some of the changes that may be made in propositions and show the analogy between this method and mathematical analysis.

2. What was Kant's theory of knowledge? What was Fichte's application of it to the external world?

3. In what sense is every object in nature "a cause"? in what "a force"? Are "cause" and "force" abstract or concrete terms when so used?

4. What was Cousin's theory of "ideas" in relation to the acquisition of knowledge?

5. Show that every object in nature and every state of an object may be regarded as a term in a series, (1) with regard to organic beings, (2) to inorganic.

XX.

1. State and illustrate the principle of identity and contradiction as a test of truth.

2. What is Sir William Hamilton's theory of knowledge—"presentative" and "representative"? What its relations to the materialism of Herbert Spencer?

3. Are there any "causes" or "forces" in nature besides material objects? What are "laws"—"the laws of Nature"?

4. What proof have we that the mind or soul is immaterial? What is the bearing of this on the doctrine of immortality?

5. What attributes do the acts of "creation" in the origin of "species" and "series" imply in the Being who performed them? What influence does the certainty of such acts have on our expectations of a Special Providence and miraculous interpositions after creation was completed?

VIII. PHYSICAL SCIENCES.

1. CHEMISTRY—PROFESSOR SCHAEFFER.

1: Define and illustrate equivalence.

1. Write graphic formulæ of water, ammonia, ferrous chloride, ferric chloride.

3. What is a chemical reaction?

4. Give illustrations of Berthollet's laws.

5. Give percentage composition of magnesic carbonate.

6. How much lead can be obtained from 564 kilogrammes of lead sulphide?

7. One litre of CH_4 in burning gives what weight of CO_2?

8. Under what barometric pressure has air the density of hydrogen?

9. At what temperature has air the density of hydrogen at zero?

10. A litre of water is to be saturated with ammonia gas at zero; how many grammes of NH_4Cl and CaO must be used in the process?

11. Describe the different forms of Carbon; give the methods of preparation and properties of the compounds of Carbon and Oxygen.

12. How is sulphur obtained? Give the preparation and properties of its important compounds with Hydrogen and Oxygen.

2. PHYSICS—PROFESSOR ANTHONY.

(1). MECHANICS.

1. What is the distinction between force and energy? In what units are each expressed? What is the relation between the ordinary and absolute units of force?

2. Two parallel forces, 8 and 12, 10 inches apart, act in opposite directions; find their resultant.

3. What work must be done to draw a body weighing 100 lbs. up an inclined plane whose base is 120 feet and height 50 feet. Coef. of friction 3.

4. A body is projected horizontally from a point 400 feet above a horizontal plane, with a velocity of 190 feet. In what time will it reach the plane? Where will it strike it?

5. What is the axis of oscillation of a compound pendulum? How found experimentally?

6. Describe the method of finding the spec. grav. of a solid by the use of the spec. grav. bottle.

(2). ELECTRICITY AND MAGNETISM.

1. (*a*) Influence of the earth upon a magnetic needle free to move in any direction. (*b*) How can a single needle be rendered astatic?

1. (*a*) Distribution of statical electricity upon insulated conductors. (*b*) Experimental proof.

3. Induction. (*a*) Define. (*b*) How charge a body by induction? (*c*) Effect on poor conductors.

4. Friction machine. Description.

5. Condensers. (*a*) Define. (*b*) Theory of. (*c*) Amount of electricity removed by each contract during the "slow discharge."

6. (*a*) Source of the electricity in Volta's pile. (*b*) Proof.

7. Bunsen's battery. (*a*) Describe. (*b*) Action. (*c*) Object of two liquids.

8. (*a*) Ohm's law. (*b*) What is the best arrangement of a battery of 600 cells, when the external resistence is 300 feet of copper wire, the resistance of each cell being equal to 18 feet of the same wire?

9. Chemical effects. (*a*) On acidulated water. (*b*) On solutions of salts of heavy metals.

10. Electrodynamics. (*a*) Laws of electrodynamic action. (*b*) Ampère's theory of magnetism. (*c*) Which is the north pole of the needle by Ampère's theory?

(3). HEAT.

1. What is meant by the coefficient of expansion of a body? Coefficient of apparent expansion of a liquid? In a centigrade thermometer, what must be the relation between the volume of the tube between 0° and 100°, and that of the bulb including that portion of the tube below 0°?

2. What is the theoretical velocity of air in a ventilating flue whose height is 50^{ft} and temperature 27° C., the external temperature being 7° C.?

3. Describe ebullition and the accompanying phenomena. What is the tension of the vapor from a boiling liquid? Effect of pressure on the boiling point. Why?

4. Water is compressed $\frac{45}{1000000}$ of its volume by a pressure of one atmosphere, what force will be required to resist the expansion for an elevation of temperature of 20°? coef. of expansion .00024.

5. Which has the greater density, air at 10° and pressure 70, or air at 30° and pressure 80?

6. What is meant by the "Spheroidal State?" State what facts you know in connection with it.

7. What is the unit of heat? What is specific heat? A body weighing 5 grammes is heated to a temperature of 100°, then plunged into 10 grammes of water at 10°, the common temperature finally reached is 12°. Required spec. heat of body.

(4). ACOUSTICS AND OPTICS.

1. Explain the formation of images by small apertures.

2. Construct the images produced by three successive reflections from a pair of parallel mirrors, with the rays by which the last image is seen.

3. Deduce formula for relation between conjugate foci of spherical mirrors.

4. What kind of mirror will produce a small inverted image of an object? Where must the object be placed?

5. What is the index of refraction of a substance which, in the form of a prism of 60° angle, gives a deviation of 30°?

Note.—The solution of the problems must be given in full.

6. What is the focal length of a meniscus of glass whose radii are, for the convex surface 24 inches, for the concave surface 12 inches? Is the lens converging or diverging?

7. How are the dark lines of the solar spectrum produced?

8. What are the elements of our judgment of distance through the sense of vision?

9. Explain the production of prismatic colors by interference.

10. What is polarized light?

11. How can it be determined whether a beam is polarized or not?

3. ASTRONOMY—PROFESSOR POTTER.

1. Illustrate and explain Foucault's method of proving the earth's rotation.

2. Explain the origin of the elements composing the equation of time, and define siderial, solar, apparent and mean time.

3. What is the cause of the precession of the equinoxes?

4. Define the tropical, siderial, anomalistic and civil year.

5. What relation does the paralax of a heavenly body bear to its distance?

6. Find the time of rising of the sun's upper limb, allowance being made for refraction.

7. Define and illustrate nutation, aberration, right ascension, declination, altitude, azimuth, amplitude and zenith distance.

8. Define the civil and astronomical day and explain the Gregorian calendar.

9. Explain the cause of the phases of the moon, and prove that its orbit is always concave to the sun.

10. Compute the values of the solar and lunar ecliptic limits.

11. Determine the latitude and longitude of any given station.

12. Give Kepler's laws and a mathematical demonstration thereof.

IX. RHETORIC, ORATORY AND GENERAL LITERATURE.

1. ENGLISH COMPOSITION—PROFESSOR SHACKFORD.

FRESHMAN YEAR, FIRST TERM.

1. What is essential to preserve Unity in a sentence?

2. In Construction and Arrangement what qualities are to be regarded?

3. In the Choice of words what qualities are to be regarded?

4. Why are Abstract and General terms less energetic than Concrete and Specific?

5. What is meant by Accuracy of expression?

6. State several ways of varying sentences.

7. What is a Loose sentence? Give an example.

8. What is Pleonasm? When is Ellipsis allowable?

9. State and explain the qualities which the Paragraph should possess.

10. What is meant by the "Law of good usage?"

11. When are Synonymous words and expressions to be used?

12. Write out the following paragraph, correcting the faults in construction and arrangement, and punctuating correctly:—

"That the earth itself is a great magnet, I propose as the problem to be solved before we separate, but the short duration of a single lecture will permit me to attack this problem only in the most general manner; and having proved that the earth is a magnet, it will not be allowed me the pleasure to examine with any minuteness the characteristics of this huge lodestone, such as the position of its poles, the path of its equator. and those mysterious variations in the direction and intensity of its force, which latter seem to be in subjection to emanations from the sun—changing with the apparent daily and yearly revolutions of that orb and pulsating in sympathy with the huge waves of fire which sweep over its surface; for, it seems probable, that on any sudden agitations of the sun's surface, the magnetism of the earth receives a profound disturbance in its equilibrium."

2. ENGLISH COMPOSITION—PROFESSOR SHACKFORD.

FRESHMAN YEAR, SECOND TERM.

1. Give an example of each degree of Personification.

2. Remark upon the figurative language in the following: (*a*) By inducing the old leaven in his council to withdraw. (*b*) I have not accustomed myself to hang over the precipice of disunion, to see whether, with my short sight, I can fathom the depth of the abyss below. (*c*) All parts of the prodigious pageant [Falls of Niagara] have an eternal novelty. (*d*) It was by the continual thundering of the inscription on the key-stone of the Republic in the ears of the North against the doors of slavery.

3. What rules are to be observed in the use of Similes?

4. State how an argument can be embodied in a Metaphor.

5. How is effectiveness given to writing or speech by figurative language?

6. What law, according to Herbert Spencer, underlies the use of figurative language?

7. Illustrate this in the case of Antithesis, Vision, and Synecdoche.

8. What is the test of the relative worth of different ways of expressing the same thought?

9. Narrate your walk to the University this morning.

10. State the best method of constructing a Scheme or Plan.

11. Give a General exposition of Monarchy.

12. State what you think of the following in regard to its diction, its style, its effectiveness, and its general merit, as a Descriptive paragraph:

But now, lo! Windermere in winter. All leafless now the groves that girdled her, as if shifting rainbows were in love perpetually letting fall their colors on the Queen of Lakes. Gone now are her banks of emerald that carried our calm gazings with them, sloping away back into the cerulean sky. Her mountains, shadowy in sunshine, where are they now? All gone. But mourn not for that loss. Lo! Pavey Ark—magnificent range of cliffs—seeming to come forward while you gaze? How it glows with a rosy light, as if a flush of flowers decked the precipice in that delicate splendor! Langdale-pikes, methinks, are tinged with finest purple. Beyond the reach of the setting sun, the Great Gabel lowers in his exclusion from the rejoicing light, and Imagination, personifying his solitary vastness into forsaken life, pities the doom of the forlorn Giant. Ha! just as the eye of day is about to shut, one smile seems sent afar to that lonesome mountain, and a crown of crimson encompasses his forehead.

13. Criticise the following Narrative paragraph:

"But over the doom of one true lover of nature let us shed a flood of

rueful tears; for at what tale shall mortal man weep, if not at the tale of youthful genius and virtue shrouded suddenly in a winding-sheet wreathed of snow by the piteous tempest! Elate in the joy of solitude, he hurried like a fast traveling shadow into the silence of the frozen mountains, all beautifully encrusted with pearls and jewels, and diamonds, beneath the resplendent night-heavens. The din of populous cities had long stunned his brain, and his soul had sickened in the presence of the money-hunting eyes of selfish men, all madly pursuing their multifarious machinations in the great mart of commerce. The very sheeted masts of ships, bearing the flags of foreign countries, in all their pomp and beauty, sailing homeward or outward bound, had become hateful to his spirit."

3. HISTORY AND ELEMENTS OF THE ENGLISH LANGUAGE—PROFESSOR SHACKFORD.

FRESHMAN YEAR, THIRD TERM.

1. What are the great Divisions or Families of languages?
2. To what great Division does English belong? Class? Branch?
3. State briefly the foreign influences that have operated in the growth and development of English.
4. What Scandinavian peculiarities are found in English etymology and syntax?
5. What has brought about the dropping of inflections?
6. Indicate the character of the changes that have taken place since the 14th century.
7. What division into Periods is generally made?
8. What are the terminations of nouns that have come from the French?
9. Whence do we get the words *geology, seraphim, algebra, orrery, reynard, parchment, magnet, imp, snow, second, three, uncle, domestic, stentorian, amen?*
10. Give the reason in each case for calling the following words Anglo-Saxon: *good, go, old, quicken, knock, father, goose, sun, buzz, three, fourth.*
11. Why is an Anglo-Saxon style strong and picturesque?
12. Name some words where the noun is Anglo-Saxon and the adjective of foreign origin.
13. Explain *free-mason, beef-eater, grocer, brand-new, island, shame-faced, Charles' wain, twilight.*
14. What are the two great Landmarks of the Semi-Saxon period?
15. What is the explanation of synonymous words often used in pairs?

16. Explain the following forms: *did*, *its*, *mine*, *here*, *once*, *him*, *whom*, *whilom*, *be* and *gain* as prefixes.

17. Give the force of the adjective suffixes, *y*, *en*, *ly*, *ed*, *ish*, *ern*, *ive*.

18. What is the relation between consonants in English and in German?

19. State the three ways of expressing the relation between the parts of a compound, with an example of each way.

20. Trace the origin of several particles.

21. State some of the causes of the anomalies in English orthography.

22. What are the peculiar characteristics of the verb?

23. Give the principal formatives of the verb, and their force.

24. To what can the substantive verb be traced back in all languages? Why called substantive?

25. Explain the auxiliaries *may*, *can*, *shall*, *will*, *should*, *would*, *could*, *do*.

26. How does a foreign word become naturalized?

27. What principle operates in causing the change commented upon in the following words: "As the pupils grow older, they do not care to read about a fair lady, but they are at once drawn to a female possessing considerable personal attractions. A brawl is a word good enough for a scuffle between peasants; but between aldermen the brawl becomes a fracas. An emeute is a far genteeler word than a riot. A farmer prides himself upon being an agriculturist."

28. Make a list of the Anglo-Saxon words, and of those of French origin in the preceding quotation.

29. Make a list of the symbolic and the presentive words.

30. Indicate the terminations for causative, intensive, frequentative, and inceptive verbs.

31. What are the three kinds of syntax?

32. State the principal heads under which changes in words may be classified, with an example of each class.

4. RHETORIC—PROFESSOR SHACKFORD.

SENIOR YEAR, FIRST TERM.

1. What test determines the class of an argument?
2. Analyse the "Sign," and give an example.
3. State the argument from Testimony in the form of a syllogism.
4. State and exemplify the "Argument from Progressive Approach."
5. What does Mr. Mill claim as the characteristic of all reasoning?
9. Illustrate the different species of "Idola," as classified by Bacon.
7. When should the Proposition be stated first, and when postponed?

8. State the character of the argument of Butler's Analogy.
9. What arguments require the utmost nicety of art to refute?
10. State and illustrate the different kinds of Introduction.
11. How are the feelings to be reached? On what does Persuasion depend?
12. What is the test of oratorical power? How is permanent effect to be produced?
13. Illustrate by examples the advantages of Indirect Description.
14. In what respect is Perspicuity relative? Why is the Metaphorical style often the clearest?
15. What is the "Theological style"? the "Suggestive"?
16. In what respects does Arrangement affect Energy of style? In what Antithesis? Interrogation?
17. What is meant by Beauty of style? How best cultivated?
18. What is the ultimate purpose of the orator? the poet? the scientific writer?

5. GENERAL LITERATURE—PROFESSOR SHACKFORD.

SENIOR YEAR, FIRST TERM.

1. The Law of Evolution in Literature.
2. This Law as unfolded in Greece and in Rome.
3. The sphere of Literature as including all that communicates *power*.
4. Matthew Arnold's view of Literary Criticism.
5. In what respect is Literature first objective, then subjective, and finally a synthesis of both.
6. The modern Historical method, and the old Abstract method of studying Literature.
7. Sainte Beuve's Pantheon of great writers.
8. Language as a Fine Art.
9. The changes in Language according to Æsthetic laws.
10. The Figurative element in Philosophic terms.
11. Poetry as a Fine Art.
12. The true Antithesis to Poetry.
13. The distinguishing Characteristics of Poetry.
14. The Pleasures of Art as different in kind from all others.
15. Plato's idea of the origin of Beauty.
16. The Classical and the Romantic in Literature.
17. A Definition of Poetry.
18. The language of Science and of Poetry.
19. The methods of Idealizing in Poetry.
20. Rhythm as depending on Quantity and on Stress.

21. The Greek and the Latin Hexameter.
22. The Pause in Verse.
23. The Heroic and the Elegiac verse as expressive of different moods and states.
24. Goethe's definition of Poetry.
25. The three different Classes of Modern poetry.
26. The three Divisions of Hindoo poetry.
27. The characteristic features of the Vedic hymns.
28. The Hindoo Epic poems.
29. The Episode of the Bhagavad-Gítá.
30. The early Greek poetry as compared with the Hindoo.
31. The Hebrew poetry in its special characteristics.
32. The Parallelism of Semitic poetry.
33. The peculiar character of the Poem of Job.
34. The origin of Rhapsodic or Epic poetry.
35. The Age of Homer according to the Arundelian marbles.
36. The Theories concerning the Homeric poems.
37. The objective character of Epic poetry.
38. The Unity of the Iliad.
39. The Unity of the Odyssey.
40. The characteristic features of the Homeric poetry.
41. Aristotle's idea of Unity in the Epic.
42. The character of Achilles and of Odysseus.
43. The relation of the Homeric poems to Grecian history.
44. The Cyclic poets.
45. The National Epic and the Art-Epic.
46. The divisions of the Art-Epic.
47. How far the Æneid an imitation of Homer, and how far original.
48. Æneas as a hero; his representative character.
49. Virgil as a poetic influence in the Middle Ages.
50. The Mythologic machinery of the "Jerusalem Delivered."

☞ Five topics assigned to each student.

6. GENERAL LITERATURE—PROFESSOR SHACKFORD.

SENIOR YEAR, SECOND TERM.

1. State the principal Historical Art-Epics, and their authors; and mention any salient points in regard to their position in a philosophical view of Literature.
2. From what sources was the Chivalric poetry of the Middle Ages derived?

3. Give a concise statement of the growth of the Heroic Poem, as seen in the Nibelungenlied.

4. Mention some examples of the Romantic Epic.

5. Criticise Tennyson's "Idyls of the King," in regard to its Epic form and character.

6. Are the subjects of the Religious Art-Epic favorable or unfavorable to Epic treatment?

7. Give your idea of "Paradise Lost" as an Epic; and state any characteristic features bearing upon it as a work of Art.

8. Name the leading representative Mock-Epics, their authors, and some characteristic traits of style and treatment.

9. What is the difference between Lucian's burlesque of wonder-stories and the real poetical myth?

10. How did the Greek drama take its rise?

11. In what respects is Sophocles the representative of Greek Tragedy?

12. State the functions of the Greek Chorus, and the place it held in the drama.

13. Give the leading points of difference between the Old, the Middle, and the New Comedy.

14. Give some account of Aristophanes.

15. State the main reason of the difference between the French and the English drama.

16. Mention some characteristics which distinguish the drama of Shakespeare from other works of the same period.

17. In what respects does Goethe's Mephistopheles differ from the legendary Devil?

18. What relation does Goethe's "Faust" bear to the present time?

19. Give an account of the inception and growth of this poem.

20. How does Auerbach speak of Lessing's "Nathan the Wise?"

21. What fundamental principle in the growth of all great works of Art is illustrated in this work?

22. State the story of the rings as told by Boccacio, and Lessing's variation from it in his poem.

23. How does Julian Schmidt characterize the humor of Dickens?

24. What is the relation of the prose Novel to the Literature of the present time? How does it differ from the Poem?

☞Six questions assigned to each student.

7. GRECIAN AND ROMAN ORATORY—PROFESSOR SHACKFORD.

SENIOR YEAR, THIRD TERM.

1. What circumstances were favorable to the cultivation of oratory in Greece?
2. State the leading points of difference between Ancient and Modern oratory.
3. Give a succinct statement of Athenian oratory before Pericles.
4. Pericles as an orator.
5. Give an analysis of the speeches attributed to Pericles by Thucydides.
6. Characterize their diction and style.
7. The influence of Sicilian Rhetoricians upon Athenian oratory.
8. Give their names and any circumstances in connection with their history.
9. What is Aristotle's definition of rhetoric?
10. What is Plato's view of rhetoric in the "Gorgias"?
11. What, in the "Phaedrus"?
12. The position and function of the orator at Athens from Pericles to Demosthenes.
13. The political and the philosophical life, as held by Plato.
14. Compare Xenophon's representation of Socrates with Plato's, in this respect.
15. Aristophanes and the Athenian Demus.
16. Figures of diction and figures of thought in the leading representatives of Athenian oratory.
17. What estimate does Aristotle put upon rhetorical ability?
18. State the office, the peculiar requirements, and the characteristic qualities of the Athenian Logographers?
19. Who were most distinguished as logographers?
20. What were the salient features of Lysias as an orator?
21. What, of Isocrates?
22. What, of Isaeus?
23. What was Demosthenes' preparation as an orator?
24. Specify the characteristics of his style.
25. What were his relations to the politics of his time?
26. What does he mean by "action"?
27. Who were his chief opponents?
28. What were the Philippics?
29. Give an analysis of the oration "On the Crown."
30. Into what periods is Roman oratory divided?

31. Compare Demosthenes and Cicero.

32. What is the difference between the development of literature at Rome and at Athens?

33. How does Cicero define an "Attic orator"?

34. What was Cicero's preparation as an orator?

35. What is included in Cicero's definition of the perfect orator?

36. What favored the development of eloquence at Rome?

37. Who were the best representatives of oratory under the Emperors?

38. What characterized the decline of eloquence?

39. Where are the only specimens of genuine eloquence, in this period of political decline, to be found?

40. What was the course of development in Rhetoric and Belles Lettres after the Italian period?

☞ Ten questions assigned to each student.

X. MILITARY SCIENCE.

1. TACTICS—PROFESSOR MAC MURRAY.

1. Draw diagram illustrating a company in line. Note by symbols the posts of officers and non-commissioned officers.

12. Describe manner of giving commands; preparatory; execution.

23. Being in line, to form column of platoons; describe duties of officers and manner of execution. Draw illustrative diagram.

14. Explain duties of first sergeant in forming company. Give commands and execution.

25. What is a file? a rank? the line of file closers? Who are in the line of file closers when the company is in line?

76. From line, to form column of fours to the front. Describe execution and illustrate by diagram.

77. Being in column of fours to form line to the right or left.

202. To wheel to right on movable pivot. Give commands and execution.

185. Company being in column of platoons, to form line. Illustrate by diagram; give commands in detail.

SPECIAL DEPARTMENTS.

The studies of the first two years of each of the special departments are to a large extent the same as those of the first two years in the course in science. Hence, most of the examination papers that follow relate to studies of the third and fourth years of the respective courses.

I. AGRICULTURE.

Besides the papers given below, all those on botany and economic entomology in the special department of natural history are included in the course in agriculture also.

1. AGRICULTURAL CHEMISTRY—PROFESSOR CALDWELL.

JUNIOR YEAR—FIRST TERM.

1. What is meant by the terms "specific gravity" and "specific heat?" How are the specific heat and specific gravity of a body determined?
2. Illustrate by examples and explain the absorptive power of solids for gases.
3. Describe and explain the phenomenon of osmose.
4. What relations do heat and electricity bear to chemical change?
5. Name the elements that compose most of the known mass of the earth in the order of the abundance of their occurrence.
6. Five pounds of nitric acid and eight pounds of ammonia may be conveyed to the soil of an acre in the annual rainfall. How much would it cost to supply an equal quantity of nitrogen in the form of ammonic sulphate, containing 90 per cent. of pure salt, and costing six cents per pound?
7. What are the chemical changes that accompany the germination of seeds?
8. What changes in the condition of the surrounding atmosphere are produced by growing plants?
9. What are the relations between fermentation, putrefaction and life?
10. What are the proofs that soil is derived from the rocks?
11. Describe the main features of water-culture experimentation.
12. How would you proceed to investigate the function of an ash ingredient of a plant?
13. In what form must the sulphur required by the plant be supplied in its food?
14. Discuss the occurrence, necessity and function of sodium, with respect to vegetable growth.
15. Describe the principal steps in a quantitative gravimetrical analysis.

2. VETERINARY MEDICINE—PROFESSOR LAW.

JUNIOR YEAR—THIRD TERM.

1. Describe the transformations of a tape worm, and detail its successive habitats in its different forms, and the morbid results of its presence. Give an example drawn from the domestic animals. What treatment would be desirable to prevent and remedy such affections?

2. Suppose a nerve, a muscle, a tendon and a bone to be respectively cut across and the intervals filled up by new material, what form of tissue would be likely to be developed in each case?

3. Describe the regular and irregular forms of strangles in young horses. State the known causes and the general plan of treatment.

4. A horse partially recovered from a violent sore throat, has a chronic discharge from the nose, which occurs most profusely, or, it may be, exclusively, when the head is depressed in the acts of feeding and drinking. State the probable lesion and what can be done for it.

5. What are the main causes of roaring in the horse? How is it to be diagnosed and what can be done to palliate or cure it?

6. State the various causes and symptoms of hydro-thorax, pneumo-thorax and hydro-pneumo-thorax. Suggest a mode of treatment for each.

7. At what ages do the horse, ox, sheep and pig respectively change their front teeth.

8. An animal has some swelling beneath the ear, and a tense, elastic, cordlike enlargement down the inner side of the curved portion of the lower jaw, across the lower border of the jaw, in front of the curve, and upward on the outer side, to near the middle of the cheek. What is probably amiss, and how can it be remedied?

9. What worms occupying the large intestines are the most troublesome to the horse? What symptoms do they produce, and how can they be got rid of?

10. A colt three weeks after castration, the wounds being almost healed, becomes nervous; excitable, walks stiffly, and when startled has the eyes retracted into their sockets, and the haws protruded over the eye-balls. What is wrong and what treatment will be demanded?

11. State the main causes of stone in the bladder in herbivora. How do urinary calculi differ in chemical composition in herbivora, carnivora and omnivora, and why?

12. How would you treat scrotal hernia in a horse and boar respectively?

13. How would you distinguish everted uterus of the cow or mare from simple protrusion of the relaxed walls of the vagina? How would you treat it?

14. State the distinctive causes and symptoms of simple paralysis after calving, and parturition fever in the cow. Which is the more fatal disease, and how should each be treated?

15. State the causes and symptoms of amaurosis.

16. What are the common lesions of the shoulder in the horse? State the symptoms and prescribe for treatment.

17. What is the nature of a splint? How should a severe case be treated, and what prospect is there of the removal of the swelling in the earlier and later stages?

18. Enumerate the common maladies of the horse's hock, and state particularly the structures involved in each.

4. APPLIED AGRICULTURE—PROFESSOR ROBERTS.

SENIOR YEAR—FIRST TERM.

1. State how air, water, heat and light influence the fertility of the soil and the growth of plants.

2. Explain how formed, classify, and give the leading characteristics of soils: also note their adaptation to the growth of grain and grasses.

3. How much change in altitnde gives a change of one degree in temperature? In this connection give the reason for frost appearing in the lowlands before it does on the adjoining hillsides.

4. State the subjects to be taken into consideration, in the selection of a farm, placing them in the order of their relative importance.

5. What are the injurious effects arising from surplus stagnant water in the soil?

6. Distinguish between moistness and wetness of soils, and illustrate by diagrams.

7. What are the effects produced on soil, climate and plants by thorough drainage.

8. Explain the Elkington system by diagram, and state when it can be advantagously applied.

9. Measure, lay out and map for thorough drainage, the vegetable garden east of Sage College; also give specifications and estimates for the same.

10. What are the objects sought by general tillage? How may we best accomplish them?

11. State the benefits arising from the mechanical division of the soil, and explain how we may often accomplish the same result by utilizing the forces of nature.

12. Give in brief the method of the preparation of the soil, planting, harvesting and marketing of the cereals; also, kind, quantity and mode of application of fertilizers.

SENIOR YEAR—SECOND TERM.

13. Give the time and mode of cutting and securing forage plants, and note the value of the same at different stages of growth.

14. Describe the mode of raising roots, by both flat and ridge culture; also give their value as food for animals.

15. Give in brief, the history of the thorough-bred horse.

16. Enumerate and describe the leading breeds of draft horses.

17. Sketch "Goldsmith Maid;" note and number on the margin the exterior points.

18. Compare each of these with the points in the draft horse, and state wherein the mechanical proportions and general conformation may and should differ.

19. Give the most approved methods of educating and training a young horse.

20. Illustrate with a horse on the campus the manner of subduing those that are vicious and wild.

21. Give stable management for road and farm horses.

22. Give the history and characteristics of Shorthorns.

23. Holsteins.

24. Ayrshires.

25. Jerseys.

26. Explain the laws of transmission or likeness.

27. Of variation.

28. State when a prepotent animal is valuable and when not.

29. Draw a circular diagram of the pedigree of the short-horn bull St. Valentine, tracing it through all its branches and down to the first volume of the English herd book and give the per cent. of alloy blood, if any.

30. Give a synopsis of the history of four leading breeds of swine.

31. State the leading characteristics of each breed and its adaptation to locality and circumstances.

32. Give the reasons why young animals will gain more pounds gross in proportion to the food consumed than old ones.

SENIOR YEAR—THIRD TERM.

33. Give the history and comparative value with reference to nearness or remoteness from large cities and cheap lands, of the followiug breeds of sheep.

34. Spanish merinos.

35. Southdowns, or mutton sheep.

36. Combing, or long-woolled sheep.

37. Give the summer and winter management of sheep and lambs.

38. Time of shearing and mode of handling and marketing the wool.

39. Fields and fences.

40. Farm buildings.

41. Farm yards and water priviledges.
42. Farm house surroundings.
43. Farm accounts. How kept.

HORTICULTURE—PROFESSOR PRENTISS.

1. Name the so-called small fruits.
2. Give the botanical name of each, and state the Natural Order to which it belongs.
3. Write out a brief treatise on the cultivation of the small fruit you regard as most valuable.
4. Propose a plan for a fruit garden of two acres which shall admit of the highest degree of economy in its thorough cultivation.
5. Give a classification of the diseases of plants.
6. Give a description of those which are most injurious to fruits.
7. Mention the diseases of all our drupaceous fruits, and state the most approved remedies.
8. Give your opinion as to the relationship of forest growth to climate.
9. Define landscape gardening, and name the different styles and schools.
10. Characterize the different styles.

II. ARCHITECTURE.

ARCHITECTURE—PROFESSOR BABCOCK.

SOPHOMORE YEAR—THIRD TERM.

BUILDING MATERIALS AND CONSTRUCTION.

1. Name the kinds of stone commonly used in building, and classify them geologically?
2. What is lime, hydraulic lime, cement, plaster-paris?
3. Why is sand mixed with lime in preparing mortar? Why is sand mixed with cement?
4. What is concrete? How is it made and what are its uses?
5. How does syenite differ from granite? What is marble, geologically speaking? What is marble, technically speaking?
6. Name the different modes of dressing stone.
7. What kinds of wood are chiefly used in building?
8. Name the principal modes of seasoning timber.
9. What metals are used in building?
10. What is glass? Name the common kinds.

11. Name the different kinds of stone walls, and make a sketch of each.

12. Make a sketch showing the English bond in brick-work. Also one showing the Flemish bond. Also one showing the common bond.

13. Name and sketch the common forms of arches.

14. Name the essential parts of a complete column.

15. Name the essential parts of a complete entablature.

16. Define the following terms: Archivolt, colonnade, arcade, machicolation, vault, quoin.

17. Sketch a king post roof-truss; a queen roof-truss; a hammer beam roof-truss.

18. Define the following terms: Purline, cambering, strut, jerkin-head, hip-rafter.

19. What materials are used for the outer covering of roofs?

20. Sketch and name the different parts of an ordinary window-frame and lifting sash.

ARCHITECTURE—PROFESSOR BABCOCK.

JUNIOR YEAR—THIRD TERM.

1. Name the orders of Greek architecture, and sketch the capital of the column of each of them.

2. Define the following terms: Hypæthral, decastyle, amphiprostyle, dipteral, pseudo-peripteral.

3. What are the three parts of an entablature, their relative positions and their uses?

4. Name and sketch the principal Greek mouldings.

5. Mention the refinements of Greek architecture, and give the reason for each of them.

6. Describe the mutule, the triglyph, and the guttæ, and state to which order they belong, and in what positions they occur.

7. Sketch the Attic, Ionic and Corinthian bases.

8. Name the parts of a capital.

9. Name and sketch the principal moldings used in Roman architecture.

10. What is a colonnade? What is an arcade? What is a peristyle?

11. Name the orders of Roman architecture.

12. What curves are used for the entasis of columns?

13. What is the height of the column, in terms of its lower diameter, in each of the Roman orders?

14. What is the usual height of the entablature, in terms of the height of the column, in the Roman orders?

15. What is a stylobate, and what are its parts?

16. What is the rule for adjusting the proportions of support, load, and intercolumniation in colonnades?

17. Define the following parts, and state in what positions they occur: Abacus, plinth, apophyge, modillion, cymatium, dentil.

18. What is the module, and how is it subdivided?

19. What is the least allowable intercolumniation in Roman colonnades? The greatest? The best?

20. What is the rule for determining the relative heights of the parts of the entablature in Roman architecture?

ARCHITECTURE—PROFESSOR BABCOCK.

1. Name and sketch some of the characteristic moldings, plain and ornamented, of the Norman style.

2. Sketch an Early English molded capital, and base.

3. Sketch and name the different kinds of bowtells.

4. Sketch the section of an Early English arch, of three orders, with hoodmolding.

5. What forms of vaulting are chiefly used in the Early English period? In the Decorated period? In the Perpendicular period?

6. Define the following terms: Formeret, Chevron, Choir, Mullion, Continuous (as applied to arch-moldings).

7. Show by sketches the wall-plane, soffit-plane and chamfer-plane of an arch.

8. In what styles are the arch-moldings in the chamfer-plane?

9. Sketch the characteristic moldings of a Perpendicular arch.

10. At what period was the flying buttress introduced, and why?

11. Show by a sketch the difference between plate-tracery and bar-tracery.

12. Show by sketches the character of Early English leaf-work, and of Decorated.

13. What is a crypt, in what part of a building is it usually placed, and what is its use?

14. Explain the usual treatment of buttresses on towers in each of the three styles of English Gothic.

15. What styles are exhibited in Canterbury Cathedral? In York Cathedral?

16. Show by a sketch, on horizontal projection, the position of an Early English arch-molding, in relation to the shaft which carries it.

17. What is diaper work, and in what styles and in what positions is it used?

18. Define the following terms: Cloister, ogive, corbel-course, squinch, broach.

19. Which of the ribs of a vault are essential to its proper construction?

20. What is the difference, constructionally, between rib-vaulting and fan-tracery or conoidal vaulting?

III. CHEMISTRY AND PHYSICS.

CHEMISTRY—PROFESSOR CALDWELL.

QUALITATIVE ANALYSIS.

SECOND YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used, to prove, both the presence of these elements, and the absence of all others: if possible, write the equations representing the final reactions by which you prove the presence of each of the elements mentioned.

1. As_2O_3, $SnCl_2$, $Pb(C_2H_3O_2)_2$, $Bi(NO_3)_3$, NH_4Cl, KCy.
2. K_4FeCy_6, HNa_2PO_4, $(NH_4)_2C_2O_4$, $Na_2B_4O_7$.
3. $Pb(C_2H_3O_2)_2$, $AgNO_3$, $HgCl_2$, Na_2SO_3, $(NH_4)_2C_2O_4$, Na_2SO_4.
4. $FeSO_4$, FeS, Cr_2O_3, Al_2O_3, $CuSO_4$, Hg_2Cl_2, $SnCl_2$.

CHEMISTRY—PROFESSOR CALDWELL.

QUANTITATIVE ANALYSIS.

THIRD YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the quantitative analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used.

1. Cupric sulphate, (the copper being precipitated as hydride).
2. Brass.
3. Rochelle salt (estimation of potassium and sodium).
4. Ferric phosphate.
5. Type metal.

CHEMISTRY—PROFESSOR CALDWELL.

THIRD YEAR, FIRST TERM.

1. What weight of Hydrogen is required to raise a weight of 5000 gms.,

and what would be its volume at -17° C. and 255 mm. barometric pressure.

2. How much iron would be required to produce that amount of Hydrogen. $Fe + H_2SO_4 + aq = FeSO_4 + aq + H_2$.

3. Define molecule. What is a simple, and what a compound molecule? Give examples.

4. What is meant by atomic and what by molecular weight? Show how the laws of definite and multiple proportion are in accordance with the atomic theory.

5. How may we distinguish between a mixture and a chemical compound?

6. What relation does the molecular weight bear to the sp. gr. of the molecule in the gaseous state?

7. What is the weight in criths of one liter of HCl?

8. The specific heat of a metal is .03244. It forms a compound with Chlorine containing 34.8 per cent. of Cl. What is the atomic weight of the metal and what is its quantivalence?

9. Molecular weight of potassic chlorate is 122.6, and 2.95 grs. contain 1.155 grs. of oxygen. Required the total atomic weight of oxygen, and the number of oxygen atoms in the molecule.

10. Analysis of a substance gives the following results:—C 26.57; H, 2.74; O, 71.11. Required the simplest formula, and the percentage composition calculated from that formula.

11. Explain variations in equivalence. What is the law that governs this variable power? Give examples.

12. What are condensed types? Give examples.

13. What are fat acids? In forming fat acids from alcohols, how are the positive radicals changed to negative ones?

14. Give the general formula for mixed ethers.

15. What is the rule for the termination of the positive radical, in the nomenclature of ternary compounds of the water type?

16. In case of variation of quantivalence in the negative radical, what are the terminations and prefixes used in the nomenclature of ternary compounds of the water type?

17. To what class does the compound represented by each of the following symbols belong:

CH_3	C_2H_5	C_2H_4	C_2O_2	K
H N	C_2H_5 N	H_2 N_2	H_2 N_2	Cl N
H	H	H_2	H_2	H

18. Express by graphic symbols the construction of the following:

C_2H_4
H_2 N_2
H_2

4. CIVIL ENGINEERING—PROFFSSOR FUERTES.*

Each student on entering the examination room, draws by lot a numbered card containing the subjects he is expected to discuss.

JUNIOR YEAR.

I.

12. Demonstrate several methods for finding the resultant of a system of forces in space.

16. Centres of gravity.

20. Develop and discuss the formula for dynamical stability.

II.

22. A mail car weighing 14 tons is supposed to stand on a track having an inclination of 69.11 feet per mile, and it is required to push the car up grade by means of laborers whose joint efforts produce a force having an inclination of 50 degrees to the horizon. Find the power required to start the car, neglecting friction.

12. A vertical wooden pcst sustaining a weight of 2000lbs, and confined by iron guides, rests upon an iron wedge which lies upon a horizontal plane. The sharpness of the wedge is 30 degrees. It is required to find the power which when applied normally to the back of the wedge will lift the load three inches. Also find the space that the wedge must describe in order to produce this result.

3. A railroad train weighing 180 tons was moving at the rate of 30 miles per hour when the breaks were applied in order to avoid a collision. 28 seconds after breaking the train, it had travelled over a distance of 700 ft., and its velocity gradually diminished to 3ft. per second. Please calculate what portion of the mechanical effect that would have destroyed the train, was converted into the work done by the breaks, and find the power spent in slacking the speed of the train.

III.

1. (*a*) Couples. (*b*) Centrifugal force. (*c*) Centre of percussion.

V.

1. Strength of shearing: (*a*) Working load. (*b*) Rupture by shearing.

6. Action of shearing force in the plane of rupture. Value of the shearing force.

* Papers which give only the general heading of a subject indicate that the student is expected to write, as fully as he may be able, upon the theory of the subject and also to develop and discuss the mathematical analysis.

11. (*a*) Modulus of proof strength for shearing. (*b*) Power that may develop the shearing stress to the limit of proof strength for elliptical, cylindrical and tubular girders.

VII.

2. Elongation of a prismatic body in terms of the elongating force: Modulus of elasticity. The force corresponding to the elongation.

7. Extension of a body by its own weight and by a weight applied at its end: (*a*) Find the elongation. Prove the law of compression. Find the ratio of total extension for any distance x from the point of application of the force. Discuss the case where l is greater or less than $\frac{P}{Fy}$. Prove that the ratio of extension to compression should at most be equal to δ at the limit of elasticity. Find the cross-section that will cause a body to crush or tear when the weight and any applied force act in the same or in opposite directions. Find the quantity of work required to extend or compress the same body its own length.

9. Find the work spent in elongating by a certain quantity, a bar of a given length and cross-section. Establish the values of the moduli of longitudinal resilience and fragility.

VIII.

42. Girder fixed at one end and loaded by two parallel forces: Find the moments of flexure. Discuss their maximum and minimum values for all positive and negative values of the pressures, and locate the points of inflection of the elastic curve.

23. General equation of the elastic curve.

62. Girders fixed at both ends: Compare the proof load for a central load, with that of a similar beam simply supported at the ends. In the case of an uniform load, find the angles of inclination at the points of inflection and the moments of the forces bending the beam. Discuss the value of the proof load for the uniformly distributed and for the central load. Eatablish the equations of the variation of the deflection of these girders.

VIII. A.

20. A cast iron hollow girder is to be put in the place of a pine beam 8 inches wide and one foot deep. Please compute what should be the thickness cf metal that would produce an equally strong beam, though retaining the same external dimensions of the original pine beam.

21. An uniform load of 8,600 lbs. is to be placed over a cast iron beam 16 ft. long, supported at one end and imbedded at the other. Required: the depth and breadth to be given to the beam under the conditions that, with a five fold security, it must be five times as deep as it is broad.

X.

1. Assume the following field notes and magnetic bearings.

* * * * * * * * *

The magnetic variation is 7 degrees, 15 minutes West. Reduce the data to the true meridian, calculate the area by latitudes and departures, prepare the plotting sheet, and from the N. W. corner of the field draw two lines that will divide the plot into three equal areas.

SENIOR YEAR.

IV.

2. Find the form of the function representing the probability of errors of observation.

3. In the triangulation of a quadrangular territory the following angles were measured from a point near the centre. (See sketch.)

* * * * * * * * *

Find the most probable values of these angles, with the understanding that the second angle has only ¼ the weight of the others.

7. Find the length of a degree of latitude in the latitude of Cornell.

VII.

1. Describe the sextant, the principle of its construction, and its adjustments, including the adjustment for eccentricity.

2. The following observations were made on May 9, 1867, with a Negus Solar Chronometer running with an insensible rate, and free from initial error.

Sextant.	*a Bootes E.*	*a Leonis W.*	*a Urs. maj. N.*
$113^{\circ}\ 0'$	$8^h\ 46^m\ 9.80^s$	$9^h\ 16^m\ 31.3^s$	$9^h\ 34^m\ 51.5C^s$
113 30	8 47 11.14	9 15 25.3	9 29 46.50

Find the latitude and time.

* * * * * * * *

VIII.

4. In a simple truss (as per sketch) subjected to an uniform rolling load, and taking into account the weight of the truss itself, find: (*a*) the general equation for the horizontal strains under the constant load for any point in either chord. (*b*) The horizontal strains for the same points when the moving load covers only a portion of the truss. (*c*) The greatest horizontal strain. (*d*) Discuss the results.

7. In a triple truss (as per sketch) please find: (*a*) the horizontal strains at panel points of upper and lower chords of trusses No. 1, No. 2 and No. 3. (*b*) The compression in triple truss at points of No. 1, No. 2 and No. 3. (*c*) The tensions at panel points of the simple trusses.

18r State the conditions, of a post and tie, under which the inclination for a minimum of material may be obtained, discuss the results of the analysis and solve any example.

XV.

8. Investigate the best form of cross-section to be given to artificial water courses.

26. Describe the conditions of efflux when an abrupt contraction takes place in a conduit by the interposition of a diaphragm, find the loss of head and the law of the coefficient of resistance; and also the coefficients of resistance and contraction when the diaphragm is removed.

34. Sketch and describe a single and a double canal lock. Find the time required for filling and emptying both kinds of locks, and establish formulæ for the water consumption under circumstances of traffic that you may assume at your will.

XVI.

7. Discuss the theory of efflux in accordance with Prof. Eddy's method.

8. Find the theoretical discharge through circular orifices in a thin plate.

19. Find the expressions for the head, diameter, velocity and delivery of long pipes, for all velocities, taking into account all resistances. Discuss the formulæ, the manner of applying them, and the precautions to be observed in designing a system of distributing pipes.

XVI. A.

3. Required: the amount of water passing a weir in a pond 100 ft. wide, with longitudinal profile, as per sketch. The depth of water above bottom of pond is 3 ft. Depth over crest, measured beyond its influence, 1½ ft. Also, please find the horse-power of the stream passing the weir after it has fallen 20 ft. below the sharp edge of the crest.

21. Water is supposed to be taken from a dam and through a four feet main, laid horizontally, the inlet end of which is on the plane of the inner slope of the dam, and making an angle of 50 degrees with it. The main is 18 ft. below the surface of the water, and only 48 ft. long, On the outward end of this main there is a stop-cock; and the water is connected by a reducer to a 3 ft. main. The valve is closed so as to obstruct, by means of an abrupt crescent shaped contraction, ⅜ of the area of the large pipe. The 3 ft. pipe is laid in a straight course for a distance of 10,000 ft., and its lower end is 162 ft. below the surface of the reservoir. Please find the delivery, and the height of a piezometer 1,000 feet from the outlet of the 3 ft. pipe.

22. In order to judge of the relative merit of several water meters, suppose that they are made to deliver water (under the same conditions of pressure and connections) through a short horizontal mouthpiece under 12 ft. of head. One of these meters is observed to deliver a turbid stream having a horizontal range of 9.8 ft., after falling through a height of 1.67

ft.; but at a vertical distance of 3.27 ft. below the outlet, the horizontal range is 4.90 ft. Required the coefficient of velocity due to the resistances offered by this meter.

XVII. A.

4. Theory of Inertia.

6. Moment of rotation.

16. Find the expressions for: (*a*) angular velocity at the distance unity from axis of rotation. (*b*) Rotation velocity, space and acceleration at any distance from axis of rotation. (*c*) Resistance of rotation of the mass. (*d*) Moment of resistance. (*e*) Moment causing the acceleration. (*f*) Energy stored in acquiring velocity. (*g*) Work developed in communicating angular velocity to the whole body. (*h*) Moment of inertia. (*i*) Moment of the force by which the mass develops the acceleration *k*. (*j*) Work done in rotating the mass with the angular velocity *w*. (*m*) Work developed in accelerating the velocity. (*n*) Final velocity.

30. Reduction of the moment of inertia.

32. Simple pendulum.

XX.

The dimensions of an oblique segmental arch bridge, are as follows:

* * * * * * * * *

Please calculate by Buck's system, (*a*) the oblique span. (*b*) Obliquity. (*c*) Angle of the soffit. (*d*) Length of heading spiral. (*e*) Number of voussoirs, [not less than 1¼ ft.]. (*d*) Thickness of voussoirs. (*e*) length of impost. (*f*) Actual divergence of courses. (*g*) Adjusted angle of soffit and axial length. (*h*) Angles of extrados and of twist. (*i*) Adjusted eccentricity. (*j*) Size of parallel rule, distance between winding sticks at intrados and extrados, and breadth of broad end of winding stick. (*k*) Triangular template for skew backs. (*l*) Describe the manner of constructing and using the templates for the six faces of the arch stones.

XXI.

3. Describe the modes of rupture of several kinds of arches. Find the pressure per units of surface upon the joints of an arch.

4. Assume any surloaded arch and obtain the thrust and curve of pressure, employing Woodbury's graphic method.

5. Establish Van Buren's general equation for calculating the stability of retaining walls. Discuss its applications in a general way.

XXIII.

5. Define and classify the different kinds of cut and rubble masonry. Manners of bonding. General specifications for the materials and workmanships.

7. Manipulations of mortars and concrete. Theory of mortars.

8. Pneumatic foundations.

5. MECHANIC ARTS.

I. LINEAR DRAWING—PROFESSOR MORRIS.

SECOND YEAR—FIRST TERM.

1. To divide the line A B into any number of equal parts. Let the number be 7, 9, 13.

2. To construct a square on a given diagonal AB.

3. To inscribe a square in any triangle ABC; in a given trapezium ABCD.

4. On a given line AB construct a regular pentagon; a regular heptagon.

5. To inscribe three equal circles in a given circle.

6. The diameters being given, draw an ellipse by intersecting arcs.

7. To construct a parabola, the base AB and abscissa CD being given.

8. To draw a hyperbola, having given the diameter AB, the abscissa and double ordinate CE.

9. To describe the cycloid, epicycloid, hypocycloid.

10. To draw a circle which shall touch both lines of an angle and shall pass through a given point P.

II. ORTHOGRAPHIC PROJECTION—PROFESSOR MORRIS.

SECOND YEAR—SECOND TERM.

1. Give the plan and elevation of a line 2 inches long when it is inclined at 70 degrees to the horizontal and 45 degrees to the vertical plane.

2. Give plan and elevation of a square plane, 3 inches side, when one of its diagonals is at 45 degrees to the horizontal and 60 degrees to the vertical plane, the other diagonal being parallel to the horizontal plane.

3. Give plan and elevation of a cube, 2 inches side, when resting on one of its solid angles, one diagonal of the base being at 50 degrees to the horizontal and the other 90 degrees to the vertical plane.

4. Draw the plan and elevation of a cylinder 5 inches long and 2 inches in diameter, when the axis is inclined at 60 degrees to the horizontal and 45 degrees to the vertical plane.

5. A pipe of sheet iron, 2 inches diameter, is to be joined so as to turn an angle of 120 degrees. Show on an elevation the inclination of the line of section, and show on a development the line in which the metal must be cut to form the required parts.

6. A cylinder 2½ inches in diameter and 6 inches long, is penetrated by another 1½ inches in diameter and 5 inches long, their axes being at right angles to each other and intersecting at their centers. Show the mode of obtaining the curves of penetration and the development of the larger cylinder.

III. MECHANISM (WILLIS')—PROFESSOR MORRIS.

THIRD YEAR—SECOND TERM.

1. Draw diagrams and explain the method of finding the velocity ratio in link-work. Give corollaries.

2. Bevel gearing.—The position of the axes being given and also the ratio of the angular velocities, describe the frustra of the cones; also find the angles at the vertices.

Teeth of wheels.—To find the smallest number of teeth or pins that can be employed when the pins have no sensible diameter.

4. Describe the odontograph and the method of using it.

5. To describe the teeth of wheels when their axes are not parallel. Example, bevel wheels.

6. In the communication of motion by sliding contact, directional relation changing, how may a varying velocity ratio be obtained?

7. Communication of motion by link-work. Problem: To determine the motion of a slide when the path of the end of the link travels in a line that does not meet the axis; what is the effect of changing the length of the link or connecting rod?

8. Trains of elementary combinations. Problem: Given the velocity ratio of the extreme axes or pieces of a train, to determine the number of intermediate axes and the proportions of the wheels or number of their teeth.

9. How may parallel motions be obtained?

10. Determinate changes—speed pullies. Problem: Let there be a set of six speed-pullies, in each group of which the diameters of the extremes are thirteen inches and four inches, to find the intermediate diameters.

IV. STEAM ENGINE—PROFESSOR MORRIS.

THIRD YEAR—THIRD TERM.

1. Describe the principal parts and appendages of boilers and furnaces.

2. State the difference between a high and a low pressure steam-engine.

3. Describe the principal parts and appendages of a high pressure steam-engine.

4. The same of a low pressure steam-engine.

5. State what you can of testing of boilers, explosions of boilers, incrustation, and care of boilers.

6. How are steam-engines classed?

7. What do you understand by a horse power?

8. How do you ascertain the nominal horse power of high pressure engines?

9. What effect is produced upon the crank pin of a locomotive by changing the length of the main rod, when the cross-head is at the center of its travel?

10. Where is the crank pin when the piston is at the center of its stroke, the main rod being four times the length of the stroke?

11. Describe the link-motion.

12. What do you understand by the terms "lead," "lap?"

V. MATERIALS EMPLOYED IN THE CONSTRUCTION—PROFESSOR MORRIS.

FOURTH YEAR—FIRST TERM.

1. Divisions of the subject.
2. Conversion of ore into cast iron.
3. Manufacture of wrought iron.
4. Steel and its production.
5. Characteristics of cast iron, wrought iron and steel.
6. Describe tempering, annealing, case hardening.
7. Zinc, tin, lead, copper and their most useful alloys.
8. Other materials besides the metals used in construction.
9. Care and preservation of materials.

VI. DESIGNING OF MACHINERY—PROFESSOR MORRIS.

FOURTH YEAR—FIRST TERM.

Select from the following subjects; give complete and detail drawings, with specifications and probable cost.

1. Lathe.—Screw-feed. Slide rest, back-geared; swing, 16 inch; bed, 9 ft.

2. Planing Machine.—To plane 22 inches wide, 20 inches high, cross and angular feed.

3. Crank planer with adjustable stroke from 16 inches down; planing 15 inches wide, 13 inches high.

4. Back-geared drill with self-feeding attachment. Traverse of table, 26 inches; of spindle, 12 inches; distance between table and spindle 34 inches; distance between base and spindle 44 inches.

5. Ten H. P. portable engine best suited to agricultural work.

6. NATURAL HISTORY.

I. BOTANY.

I. SYSTEMATIC AND APPLIED BOTANY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—FIRST TERM.

1. Name the five principal groups into which plants are arranged in the natural system of classification.

2. State briefly the distinguishing characteristic of each of these groups.

3. What are plant characters?

4. From what parts of plants are characters of the highest importance derived?

5. Define species, genus, and order.

6. Name ten natural orders which can be easily distinguished by brief characters and state what these characters are.

7. Give a schedule of some species of Rosaceæ proper.

8. On what principle and by whom was the present arrangement of natural orders first adopted?

9. Why is it impossible to express the affinities of the natural orders in a linear arrangement?

10. Mention such indigenous Saxifragaceæ as you know to abound in the flora of Ithaca.

11. Name the cultivated Saxifragaceæ.

12. Name the six largest natural orders as regards the number of species.

13. Give an account of the distribution of the species of the orders Magnoliaceæ, Leguminosæ, Compositæ and Gramineæ.

14. What are the six most important orders as furnishing food plants in temperate regions?

15. What six orders furnish the most important timber plants?

16. Name the orders which furnish the most extensively used medicines.

17. Name the four plants which furnish very extensively used beverages in different parts of the world, state the order to which each belongs, and give some account of its natural history.

18. The same of the four important sugar-producing plants.

19. Enumerate the products of Euphorbiaceæ, Urticaceæ, Solonaceæ, Chenopodiaceæ, Cruciferæ and Coniferæ, giving as far as possible the scientific names of the most important plants.

20. What orders form the natural group called Amentaceæ?

21. Characterize the sub-orders of Rosaceæ, Leguminosæ, and Compositæ.

22. How do Cyperaceæ differ from Gramineæ?

23. Into what groups can Gramineæ be conveniently arranged for purposes of study?

24. State what the following vegetable products are, and name the plants which produce them: camphor, ginger, alkanest, elaterium, aloes, gum arabic, manna, caoutchouc, gum lac, cinnamon, cloves, nut-meg, turpentine, opium, logwood, rattan, boxwood, assafœtida, croton oil, fustic, jute, saffron, tonka bean, jujube, vanilla.

25. Give some statistics of species, genera, and orders, and of indigenous and introduced plants.

2. VEGETABLE PHYSIOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Describe the vegetable cell and treat of its structure, different forms and physical properties.

2. Give a classification of the different contents of cells and name those of each class.

3. Define and describe the different kinds of plant tissue.

4. Name the fundamental plant organs.

5. What are homologous organs?

6. What is absorption? Give an account of the result of the latest researches concerning this function of plants.

7. What is transpiration? Show how the existence of this function may be demonstrated and the amount of transpiration measured.

8. Treat of plant respiration.

9. Give some account of circulation in plants, and of crude and elaborated sap.

10. Describe the process of assimilation, and name the conditions under which it takes place.

11. Give a classified table of the products of assimilation.

12. Write out an account of starch, describing its formation, structure, variation, and use in the economy of the plant.

13. Name the four elements of the organic constituents of plants, and explain their source in nature.

14. Treat of plant food.

15. How do fertile differ from poor soils in relation to plant growth?

16. Give diagrams of cross sections of exogenous, endogenous and cryptogamous stems, the first in full detail of structure.

17. Describe the medullary system of the exogenous stem in reference to the grain of cabinet and finishing woods.

18. What are the organs of fructification in the phænogamia?

19. Show that a flower is homologous with a branch.

20. Describe the process of fertilization in phænogams.

21. What is the present state of knowledge in regard to the sexuality of cryptogams?

22. Describe the process of fertilization in Filices.

23. How do seeds differ from spores.

24. Describe briefly the methods instituted by nature for the distribution of the species of plants.

3. FUNGOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Draw a diagram of Æcidium Claytoniatum, and explain its structure.

2. State the specific differences of Æ. Claytoniatum and Æ. berberidis.

3. Explain the structure and supposed office of spermogonia.

4. What is meant by di-morphism?

5. Give an illustration from the false species Uredo rosæ.

6. What effect have parasitic fungi on the plant which nourishes them?

7. What is meant by alternate generation?

8. Illustrate this by a description of the change of forms in Uromyces appendiculatus.

9. Explain the structure of the conidia of Cystopus candidus.

10. Also of the zoöspores of the same plant.

11. How is a parasitic fungus of any given crop transmitted to the succeeding crop?

12. Give the results of Doctor de Bary's experiment with the zoöspores of C. candidus.

13. Under what name is the immature wheat rust known?

14. What advantage to parasitic fungi is the production of different forms of fruit?

15. What remedies are available for rust in wheat?

16. Give a description of corn smut.

17. Also of the disease known as bunt.

18. Give some account ot the potato rot fungus.

19. Also of the mildew of the grape vine.

20. What remedy is applicable to the latter disease?

21. What is the vinegar plant?

22. How do fungi induce fermentation?

23. What is known of the fungus which causes the disease called yellows?

24. Describe the fungus which causes the black-knot of plum and cherry.

25. How do fungi produce the decay in timber called dry-rot?

26. How may the attack of this fungus be prevented?

27. Draw a vertical section of Agaricus campestris, and name the parts.

28. How are edible distinguished from poisonous fungi?

29. State the characteristics of the six families of fungi.

30. Give a brief general description of fungi, as to their size, form and color.

31. Compare fungi with phænogamia as to their nutrition.

32. What are the uses of fungi?

33. Mention the diseased causes by fungi, in which prevention or remedy is practicable.

34. Also those in which no available remedy is known.

35. Mention the species of fungi which produce secondary forms of fruit on which false species have been founded.

2. ZOOLOGY.

I. ECONOMIC ENTOMOLOGY—INSTRUCTOR COMSTOCK.

1. Describe the articulate plan of structure.

2. Characterize the class *Insecta*.

3. Give tabular arrangement of the orders and suborders of the class *Insecta*.

4. Characterize the order *Hexapoda*.

5. Characterize the suborder *Lepidoptera*.

6. Explain the terms, larva, pupa, chrysalis, imago, incomplete metamorphoses and complete metamorphoses.

7. Give tabular arrangement of the typical mouth-parts of a true insect (*Hexapoda.*)

8. What hymenopterous insects are social, and how do they differ from closely allied solitary forms?

9. Name two families of the *Hymenoptera* that are parasitic. Describe briefly their habits.

10. Characterize and give the habits of the *Sphingidae*; also *Aegeriadae*.

11. Describe the habits of the coddling-moth. Name remedies.

12. Describe the metamorphoses of the mosquitoes.

13. Describe the habits of the ground-beetles (*carabidae*), May-beetles (*Lachinosterna*), *Saperda Bivittata*, plant-lice, the snowy tree-cricket, ant-lion, aphis-lion and caddis-worms.

II. COMPARATIVE ANATOMY—PROFESSOR WILDER.*

1. Enumerate the fishes of Cayuga lake.

2. Contrast the external and internal structure of the lamprey (*Petromyzon*), and the eel (*Anguilla.*)

3. Describe the development of *Petromyzon*.

4. Give diagrams (as transverse and longitudinal views) of the respiratory apparatus of *Amphioxus*, *Myxime*, *Bellostoma* and *Petromyzon*.

*This is a special course for the students in the natural history course and for others who choose to take it. It extends through the second and third trimesters. The subjects vary from year to year, the purpose being to give a complete account of a few forms or groups of animals, with discussion of their relations and bibliographical references. The questions here given are mainly those of the third term of 1873–4. The lectures of the second term were given by Professor W. S. Barnard upon the Protozoa, Coelenterata and worms.

5. Give the external and internal characters of *Amia*, and name the teleostean genera to which it has some resemblance.

6. Compare the gar-pike (*Lepidostens*) with the sturgeon (*Accipenser*).

7. Describe the brain of *Menobranchus*, and compare it with the brains of other Batrachians.

3. GEOLOGY.

In consequence of the absence of Professor Hartt in Brazil no examination papers can be given that will adequately represent the work done in the special department of geology.

Associate Alumni.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, held on Wednesday, June 26, 1872, the day preceding the annual Commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION, ADOPTED JUNE 26, 1872,

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872,

AMENDED JUNE, 1873.

Article I.—1. There shall be two standing committees, an executive committee and an auditing committee.

2. The executive committeee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this

committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

The order of business at each regular meeting shall be as follows: (*a*) The secretary shall ascertain the names of the members present by roll call or otherwise. (*b*) Reading the minutes of the last meeting. (*c*) Treasurer's report and the referring of it to the auditing committee. (*d*) Report of the executive committee. (*e*) Reports of special committees. (*f*) Miscellaneous business. (*g*) Election of officers and committees. (*h*) Election of Trustee or Trustees. (*i*) Adjournment.

Article II.—1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties, the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not hereinbefore provided for, shall be elected as follows: The president, by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of New York, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1874—75.

President.—E. D. Jackson. *Vice-Presidents.*—G. M. Luther, '70, S. F. Huntley, '71, J. B. Lawrence, '72, P. D. Finnegan, '73. *Recording Secretary and Treasurer.*—C. E. Van Cleef, '71. *Corresponding Secretary.*—H. L. Sprague, '73. *Executive Committee.*—H. L. Sprague, C. E. Van Cleef, H. V. L. Jones, C. F. Hendryx, S. H. Barnum. *Auditing Committee.*—R. G. H. Speed, Royal Taft, G. H. Breed.

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THE

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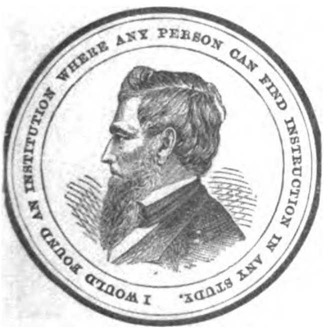
University Register

AND CATALOGUE

1875-76

THIRD EDITION



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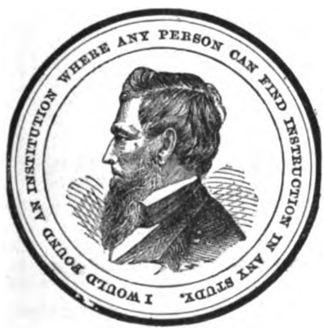

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1875

CONTENTS.

THE CALENDAR.

1875	Sept. 13		Fall Term.
September	13	Monday	Entrance Examinations.
September	14	Tuesday	Entrance Examinations continued.
September	15	Wednesday	REGISTRATION for the Term.
September	16	Thursday	Instruction begins.
November		Thursday	THANKSGIVING DAY.
December	13	Monday	Term Examinations begin.
December	17	Friday	Term Examinations end.
December	21	Tuesday	Term ends.
1876	**Jan. 4**		**Winter Term.**
January	4	Tuesday	Entrance Examinations.
January	5	Wednesday	REGISTRATION for the Term.
January	6	Thursday	Instruction begins.
January	11	Tuesday	FOUNDER'S DAY.
February	22	Tuesday	WASHINGTON'S BIRTHDAY.
March	20	Monday	Term Examinations begin.
March	24	Friday	Term Examinations end.
March	25	Saturday	Spring Recess begins.

1876 Mar. 28 Spring Term.

March	28	Tuesday	Entrance Examinations.
March	29	Wednesday	REGISTRATION for the Term.
March	30	Thursday	Instruction begins.
May	12	Friday	Woodford Prize Competition.
May	22	Monday	Commencement Essays handed in.
May	29	Monday	Senior Examinations begin.
May	30	Tuesday	DECORATION DAY.
June	5	Monday	Term Examinations begin.
June	10	Saturday	Term Examinations end.
June	12	Monday	Entrance Examinations.
June	13	Tuesday	Entrance Examinations end.
June	14	Wednesday	Annual Meeting of Associate Alumni.
June	15	Thursday	ANNUAL COMMENCEMENT.

1876 Sept. 11 Fall Term.

September	11	Monday	Entrance Examinations.
September	12	Tuesday	Entrance Examinations continued.
September	13	Wednesday	REGISTRATION for the Term.
September	14	Thursday	Instruction begins.

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THEODORE W. DWIGHT, LL. D., New York City.
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* Arranged, with the exception of the officers of the Faculty, in the order of seniority of appointment. In case, however, any Professor has been au Assistant-Professor first, his name occurs in the order of the date of the latter appointment.

CHARLES FRED HARTT, M. A., [Absent in Brazil.]
Professor of General, Economic and Agricultural Geology.

ALBERT N. PRENTISS, M. S., 116 Cascadilla.
Professor of Botany, Horticulture and Arboriculture.

JOHN L. MORRIS, M. A., C. E., University Avenue.
Professor of Mechanical Engineering and Machine Construction.

ZIBA HAZARD POTTER, M. A., M. D., LL. B., 142 Cascadilla.
Assistant Professor of Mathematics.

CHARLES A. SCHAEFFER, M. A., PH. D., Cor. Seneca and Factory.
Professor of General and Analytical Chemistry, and Mineralogy.

WILLIAM E. ARNOLD, M. A., 130 Cascadilla.
Assistant Professor of Mathematics.

WATERMAN T. HEWETT, M. A., Giles Place.
Assistant Professor of Greek and German.

BELA P. MACKOON, M. A., 93 E. Buffalo St.
Assistant Professor of Latin and German.

BAYARD TAYLOR, M. A., Kennet Square, Pa.
Non-Resident Professor of German Literature.

CHARLES H. WING, B. S., Jamaica Plain, Mass.
Non-Resident Professor of Organic Chemistry, and of Chemistry applied to Manufactures.

ALFRED STEBBINS, M. A., 110 N. Aurora.
Assistant Professor of South European Languages.

LUCIEN A. WAIT, B. A., 108 Cascadilla.
Assistant Professor of Mathematics.

TRACY PECK, M. A., Eddy St.
Professor of the Latin Language and Literature.

ISAAC FLAGG, PH. D., E. State St.
Professor of the Greek Language and Literature.

CHARLES CHAUNCY SHACKFORD, M. A., University Av.
Professor of Rhetoric and General Literature.

REV. CHARLES BABCOCK, M. A., University Grounds.
Professor of Architecture.

HIRAM CORSON, M. A., Bet. Heustis and Eddy Sts.
Professor of Anglo-Saxon and English Literature.

WILLIAM A. ANTHONY, PH. B., Dryden Road.
Professor of Physics and Experimental Mechanics.

JOHN E. SWEET, 148 Cascadilla.
Master Mechanic and Director of the Machine Shop.

HJALMAR HJORTH BOYESEN, PH. D., 120 Cascadilla.
Assistant Professor of the North European Languages.

T. FREDERICK CRANE, M. A., University Avenue.
Professor of Spanish and Italian and Assistant Professor of French.

JAMES EDWARD OLIVER, M. A., Heustis St.
Professor of Mathematics.

ESTEVAN A. FUERTES, PH. B., C. E., 57 Cascadilla.
Professor of Civil Engineering.

WILLIAM E. BYERLY, PH. D., 126 Cascadilla
Assistant Professor of Mathematics.

FREDERICK L. O. RŒHRIG, PH. D., M. D., Eddy St.
Professor of Living Asiatic Languages, and Assistant Professor of French.

EDWIN C. CLEAVES, B. S., Heustis St.
Assistant Professor of Free-hand Drawing and of Mechanical Draughting.

ISAAC P. ROBERTS, University Farm.
Professor of Agriculture.

FELIX ADLER, M. A., PH. D., New York City.
Non-Resident Professor of Hebrew and Oriental Literature and History.

ELLIOTT W. STEWART, Buffalo, N. Y.
Non-Resident Professor of the Principles of Agriculture.

WILLIAM P. VAN NESS, 1st Lieut. U. S. Art., Ithaca Hotel.
Professor of Military Science and Tactics.

ABRAM A. BRENEMAN, B. S., 147 E. Buffalo St.
Assistant Professor of Applied Chemistry.

THEODORE B. COMSTOCK, B. S., 147 E. Buffalo St.
Assistant Professor of General and Economic Geology.

CHARLES LEE CRANDALL, B. C. E., West Hill.
Assistant Professor of Engineering.

OTHER UNIVERSITY OFFICERS.

STEPHEN M. BABCOCK, A. B.,
Instructor in Chemistry.

JOHN HENRY COMSTOCK, B. S.,
Instructor in Economic Entomology.

WILLIAM RUSSELL DUDLEY, B. S.,
Instructor in Botany.

EDMUND LE B. GARDINER, B. M. E.,
Instructor in Mechanic Arts.

EDWARD P. JENNINGS, C. E.,
Instructor in Chemistry.

WILLIAM R. LAZENBY, AG. B.,
Instructor in Horticulture and Superintendent of the Botanical aud General Garden.

GEORGE S. MOLER, B. M. E.,
Instructor in Physics.

PHILIP H. PERKINS, B. C. E.,
Instructor in Rhetoric and Composition.

ERASMUS D. PRESTON, B. C. E.,
Instructor in Engineering and Architecture.

FREDERIC W. SIMONDS, B. S.,
Instructor in Zoölogy and Paleontology.

B. HERMON SMITH,
Director of the University Press and Instructor in Typography.

GEORGE W. HARRIS, PH. B., *Assistant Librarian.*
GEORGE BERRY, ARCH. B., *Master of the Chimes.*

SPECIAL FACULTIES.

AGRICULTURE—The PRESIDENT, Professor ROBERTS *Dean*, Professors CALDWELL, HARTT, LAW, PRENTISS, WILDER, and Mr. COMSTOCK.

ARCHITECTURE—The PRESIDENT, Professor BABCOCK *Dean*, Professors OLIVER, FUERTES, ARNOLD and CLEAVES.

CHEMISTRY AND PHYSICS—The PRESIDENT, Professor SCHAEFFER *Dean*, Professors ANTHONY, CALDWELL, WING, BRENEMAN, and Messrs. BABCOCK and JENNINGS.

CIVIL ENGINEERING—The PRESIDENT, Professor FUERTES *Dean*, Professors BABCOCK, MORRIS, OLIVER, ARNOLD, and CLEAVES.

HISTORY AND POLITICAL SCIENCE—The PRESIDENT, *Dean*, Professors RUSSEL, DWIGHT, GOLDWIN SMITH, and WILSON.

ANCIENT AND ASIATIC LANGUAGES—The PRESIDENT, Professor PECK *Dean*, Professors FLAGG, FISKE, RŒHRIG, WILSON, and ADLER.

NORTH EUROPEAN LANGUAGES—The PRESIDENT, Professor FISKE *Dean*, Professors BOYESEN, HEWETT, MCKOON, and BAYARD TAYLOR.

SOUTH EUROPEAN LANGUAGES—The PRESIDENT, Professor RUSSEL *Dean*, Professors CRANE, RŒHRIG, STEBBINS, and JAMES RUSSELL LOWELL.

MATHEMATICS—The PRESIDENT, Professor OLIVER *Dean*, Professors ANTHONY, BABCOCK, FUERTES, MORRIS, BYERLY, POTTER, and WAIT.

THE SIBLEY COLLEGE OF MECHANIC ARTS—The PRESIDENT, Professor MORRIS *Dean*, Professors ANTHONY, BABCOCK, FUERTES, OLIVER, CLEAVES and SWEET.

MILITARY SCIENCE AND TACTICS—The PRESIDENT, Professor VAN NESS.

NATURAL HISTORY—The PRESIDENT, Professor PRENTISS *Dean*, Professors HARTT, LAW, WILDER, WILSON, T. B. COMSTOCK, and Messrs. J. H. COMSTOCK, DUDLEY, and SIMONDS.

PHILOSOPHY AND LETTERS—The PRESIDENT, Professor SHACKFORD *Dean*, Professors CORSON, WILSON, ADLER, LOWELL, and BAYARD TAYLOR.

CATALOGUE OF STUDENTS.

RESIDENT GRADUATES.

BEATTIE, ARTHUR A., B. M. E., Cornell, Salem
Chemistry and Physics.

BERRY, GEORGE, Arch. B., Cornell, Afton, Minn.
Architecture.

FLICKINGER, SAMUEL J., A. M., Otterbein, Dayton, O
History and Political Science.

FOOTE, CHARLES W., A. B., Western Reserve, Tallmadge, O.
Chemistry and Geology.

GREENE, ALMON C., B. C. E., Cornell. Palmyra
History and Political Science.

HORTON, DUDLEY R., B. S., Cornell, City Island
History and Political Science.

HUNTLEY, SANFORD F., B. S., Cornell. Union Springs
Chemistry and Physics.

LEE, JOHN S., B. S., Iowa State, Ames, Iowa.
Chemistry.

MACOMBER, JOHN K., B. S., Iowa State, Ames, Iowa.
Physics.

PERKINS, PHILIP H., B. C. E., Cornell, Kennebunkport, Me.
Literature.

SMITH, BELLE B., S. and Lit., Oxford. Oxford, O.
Modern Languages and Literature.

STRAIGHT, HENRY H., A. B., Oberlin, Oswego
Natural History and Philosophy.

THOMAS, JULIA J., A. B., Cornell, Philadelphia, Pa.
Greek Language and Literature.

UNDERGRADUATES.

IN THE FOURTH YEAR OR SENIOR STUDIES.

Ashley, James Maceriel,	Toledo, O.,	*Science*
Aylen, Charles Peter,	Aylmer, Can.,	*Engineering*
Ballard, Austin,	Louisville, Ky.,	*Science, Opt.*
Barclay, Charles,	Longmont, Col.,	*Science*
Barros, Carlos Paes de,	Sorocaba, Brazil,	*Engineering*
Berry, William James,	Forestville,	*Arts*
Blend, Wellington,	Addison Hill,	*Agriculture, opt.*
Boardman, George,	Seneca Falls,	*Mechanic Arts*
Brewer, Charles Temple,	Cooperstown,	*Philosophy*
Brown, James Taylor,	Wappinger's Falls,	*Mechanic Arts*
Bueno, Francisco de Assis Vieira,	S. Paulo, Brazil,	*Engineering*
Cady, Jeremiah Kiersted,	Indianapolis, Ind.,	*Architecture*
Carpenter, Charles Francis,	Utica,	*Mechanic Arts*
Church, Edwin Fayette,	Elmira,	*Mechanic Arts*
Coan, Claude Collins,	Clinton, Ia.,	*Science*
Conable, Morris Robinson,	Cortland,	*Engineering*
Coon, Charles Barton,	Burdett,	*Science*
Coon, Spencer Houghton,	New York City,	*Arts*
Copeland, Ernest Roscoe,	Monroe, Wis.,	*Natural History*
Crandall, Ella Lucy,	Ithaca,	*Science*
Dowling, Lawrence,	Bradford,	*Agriculture*
Eddy, Sula Sperry,	Elmira,	*Science*
Eidlitz, Alfred Francis,	New York City,	*Engineering*
Ensign, Amos Merchant,	Walton,	*Science*
Esty, Clarence Houghton,	Ithaca,	*Arts*
Farmer, William Franklin,	Pepperell, Mass.,	*Engineering*
Flannery, Daniel Franklin,	Oil City, Pa.,	*Science*
Francis, Charles Spencer,	Troy,	*Science, Opt.*
Frayer, Eugene,	Carson, O.,	*Arts*
Garver, Madison Monroe,	Pecatonica, Ill.,	*Chemistry and Physics*
Hackney, Herbert,	Bay View, Wis.,	*Mechanic Arts*

Hadley, Hermann McClure,	Brewster Station,	*Architecture*
Heath, Frank Elijah,	Pittsburg, Pa.,	*Science*
Humphrey, Andrew Beaumont,	Columbus, O.,	*Science*
Jones, Milton Trafton,	Utica,	*Science*
Kent, Arthur Zenas,	Ithaca,	*Mechanic Arts*
Kent, Walter Henry,	Busti,	*Chemistry*
Looney, Francis,	Buffalo,	*Science, Opt.*
Maltby, Albert Elias,	Fayetteville,	*Engineering*
Mandeville, Charles Baker,	Elida, Ill.,	*Science*
Manny, Edmund Wiggins,	Galesburgh, Ill.,	*Mechanic Arts*
McDowell, Willis Gaylord,	Memphis,	*Arts*
McMullen, Justus Clark,	Unionville,	*Engineering*
Moore, Rachel Leedom,	Wilmington, Del.,	*Science*
Noyes, Fred William,	Dansville,	*Philosophy*
Ostrom, John Nelson,	East Randolph,	*Engineering*
Outerbridge, Franklin,	Hamilton, Bermuda,	*Mechanic Arts*
Palmer, Lelia Belinda,	Ithaca,	*Science*
Parker, William Henry,	Ogdensburg,	*Architecture*
Parkhurst, Clayton Raymond,	Scriba,	*Science*
Parmelee, James,	Youngstown, O.,	*Science*
Partenheimer, Philip Joseph,	Ithaca,	*Engineering*
Prado, Bento de Almeida,	Itú, S. Paulo, Brazil,	*Agriculture*
Raymond, Charles Ward,	San Francisco, Cal.,	*Engineering*
Rice, Henry Joseph,	Cazenovia,	*Natural History*
Roy, William King,	Wappinger's Falls,	*Chemistry*
Rueppele, Herman Augustus,	St. Louis, Mo.,	*Chemistry*
Russel, Howland,	Ithaca,	*Arts*
Saunders, Charles Fenner,	Westerly, R. I.,	*Architecture*
Seeley, Herman Barker,	Ogdensburg,	*Architecture*
Sinton, Margaretta Jane,	Ithaca,	*Science*
Smith, Clinton Bloodgood,	Flushing,	*Science*
Snedecor, James George,	Memphis, Tenn.,	*Literature, Opt.*
Snell, Alfred Lasher,	St. Johnsville,	*Science*
Stanton, Theodore,	Tenafly, N. J.,	*Arts, Opt.*
Stubbs, James Henry,	Framingham, Mass.,	*Engineering*
Sturdevant, James Warner,	Spartansburg, Pa.,	*Science*
Sturges, Stephen Perry,	Mansfield, O.,	*Arts*
Sturges, Will Perry,	Mansfield, O.,	*Science*
Tarleton, John Berry,	Epsom, N. H.,	*Architecture*

Taylor, Frank Everett,	Hinsdale, N. H.,	*Mechanic Arts*
Terrell, Charles,	Oxford, O.,	*Architecture*
Terry, Herbert,	Fair Haven, Mass.,	*Chemistry*
Thompson, Ellis Dunn,	Bound Brook, N. J.,	*Engineering*
Tilden, Harriet Converse,	Chicago, Ill.,	*Literature*
Van Velzer, Charles Ambrose,	Baldwinsville,	*Science*
Wagner, Edward Augustine,	Pultney,	*Science*
Wheelock, Charles Brackett,	Austin, Texas,	*Engineering*
Willmarth, Charles Henry,	Addison, Vt.,	*Agriculture*
Woodruff, Charles Philip,	Conesus Centre,	*Science*
Yatabe, Riokichi,	Japan,	*Science*
Young, Frank Oliver,	Blue Island, Ill.,	*Science*

IN THE THIRD YEAR OR JUNIOR STUDIES.

Abell, Walter,	San Francisco, Cal.,	*Engineering*
Aldrich, David Sands,	Palmyra,	*Agriculture, Opt.*
Ames, Willis Chester,	Whitney's Point,	*Engineering*
Aylen, John,	Aylmer, Can.,	*Engineering*
Balch, Albert Frank,	St. Johnsbury, Vt.,	*Architecture*
Barnard, Philip,	Lake View, Ill.,	*Science, Opt.*
Barto, Daniel Otis,	Jacksonville,	*Literature*
Bassett, Emory Newell,	Knoxville, Ill.,	*Engineering*
Baum, Morris Clarke,	Evansville, Ind.,	*Literature, Opt.*
Bean, Charles Melville,	McGrawville,	*Agriculture*
Beaty, Jenny Bell,	Salem,	*Science*
Bingham, Charles Elbert,	Tallmadge, O.,	*Agriculture*
Bingham, Homer William,	Monroe, Wis.,	*Science*
Boynton, William Seward,	St. Johnsbury, Vt.,	*Literature*
Bramhall, William Ely,	Jersey City, N. J.,	*Engineering*
Bruce, Ida,	New York City,	*Arts*
Caldwell, Charles Ayer,	Rochester, N. H.,	*Philosophy, Opt.*
Carman, Annis Smith,	Ithaca,	*Science*
Carrington, William Theodore,	Toledo, O.,	*Science, Opt.*
Castro, Thomaz de Aquinoe,	Rio de Janeiro, Brazil,	*Engineering*
Clark, Perry Daniel,	Forestville,	*Philosophy*
Cobb, Charles Simeon,	Andover,	*Science*

Cook, Seward Dudley,	Newfield,	*Science*
Coon, John Sayler,	Burdett,	*Mechanic Arts*
Cooper, Charles Marion,	Indianapolis, Ind.,	*Science*
Crim, Frank Dwight,	Mohawk,	*Science*
Culbreth, David Reynolds Manuel,	Henderson, Md.,	*Arts, Opt.*
Deming, William Lloyd,	Salem, O.,	*Architecture*
Dennis, Waldo Emerson,	Amanda, O.,	*Science, Opt.*
Dewsnap, Samuel Gatfield,	Middletown,	*Chemistry, opt.*
Dobbyn, William Richard,	Shetland, Canada,	*Arts, Opt.*
Dunn, John Gibson,	Lawrenceburg, Ind.,	*Science, Opt.*
Eidlitz, Leopold,	New York City,	*Mechanic Arts*
Foster, Henry Ward,	Ithaca,	*Arts*
Frota, Antonio Epaminondas de Marie,	Ceará, Brazil,	*Engineering*
Gage, Simon Henry,	Worcester,	*Natural History*
Gentleman, Willard,	Ottawa, Ill.,	*Science, Opt.*
Gifford, William Stewart,	Jamestown,	*Science*
Gillett, George Washington,	Villanova,	*Literature*
Grove, Benjamin Hershey,	Buffalo.	*Arts*
Halsey, Frederic Arthur,	Unadilla,	*Mechanic Arts*
Haviland, Merritt Elvin,	Glen's Falls,	*Science*
Hawkins, John Henry Willis,	Binghamton,	*Architecture*
Hill, William Squire,	Rome,	*Literature*
Hine, Frank Brooks,	Edon, O.,	*Natural History*
Howard, Leland Ossian,	Ithaca,	*Philosophy, Opt.*
Keith, William,	Warsaw,	*Chemistry*
Kennedy, Robert Playford,	Philadelphia, Pa.,	*Arts, Opt.*
King, David Woodbury,	Chateaugay Lake,	*Architecture*
Lape, Willard Eugene,	Troy,	*Mechanic Arts*
Leal, Malcolm,	Cortland,	*Chemistry, Opt.*
Lee, Richard Henry,	Harlem Springs, O.,	*Engineering*
Lehmaier, Jacob Schwartz,	New York City,	*Philosophy, opt.*
Loos, Augustus Jacob,	Philadelphia, Pa.,	*Science*
Lucas, William Edward,	Groves, Ind.	*Philosophy, Opt.*
Macpherson, David Joseph,	Bay City, Mich.	*Engineering*
Mann, Louis Morris,	Milwaukee, Wis.,	*Engineering*
Matchett, Edwin Lindsay,	Greenville, O.,	*Arts*
Maxwell, Frank Adams,	Clymer,	*Engineering*
McCormick, Cyrus Hall,	Henderson, Ky.,	*Engineering*
McGill, William Morey,	Pittsburgh, Pa.,	*Science*

McNairy, Amos Bush,	Cleveland, O.,	*Mechanic Arts*
Mead, Theodore Luqueer,	New York City,	*Engineering*
Milford, James Stanley,	New York City,	*Engineering*
Monroe, James Smith,	West Milford, N. J.,	*Science, Opt.*
Moraes, Domingos Correa de,	S. Paulo, Brazil,	*Engineering*
Mould, Charles Town,	Utica,	*Architecture*
Myers, Ira Henry,	Nunda Station,	*Science*
Nash, Herman Woodworth,	Ithaca,	*Science, Opt.*
Oliver, Mary Ellen,	Lynn, Mass.,	*Philosophy, Opt.*
Oppenheim, William Sigmund,	Bluffton, Ind.,	*Literature, Opt.*
O'Niell, Everett,	Savannah,	*Philosophy*
Palmer, Edward Herendeen,	Rochester,	*Science*
Palmer, Minerva,	Rochester,	*Literature*
Patrick, Frank,	New Philadelphia, O.,	*Philosophy*
Peck, Theodore Barnard,	Bristol, Ct.,	*Architecture*
Pennock, Frederick Moses,	Ithaca,	*Agriculture*
Phillips, George Henry,	Newark, N. J.,	*Mechanic Arts*
Pleak, William Robinson,	Adams, Ind.,	*Literature, Opt.*
Queiroz-Telles, Antonio, neto,	S. Paulo, Brazil,	*Engineering, Opt.*
Randolph, Beverly Strother,	Martinsburg, W. Va.,	*Eng'ng, Opt.*
Reilly, William James,	Erie, Pa.,	*Engineering*
Rice, Dwight Carlton,	Hamilton,	*Engineering*
Roberts, Milton Josiah,	Norwalk, O.,	*Natural History, Opt.*
Sanford, Ferdinand Van Derveer,	Warwick,	*Science*
Schwerdtfeger, Emil,	New York City,	*Arts, Opt.*
Sellew, Emma Jane,	Dunkirk,	*Arts, Opt.*
Sherman, Elroy Delos,	Cleveland, O.,	*Science, Opt.*
Sherman, Merritt Masters,	Salem,	*Literature, Opt.*
Sherman, Walter Justin,	Norwalk, O.,	*Engineering*
Silveira, José Luiz Monteiro de,	Rio de Janeiro, Brazil,	*Engineering*
Simpson, William Kelley,	Hudson,	*Science, Opt.*
Sinton, William Kelly,	Ithaca,	*Science*
Smith, Eugene Raymond,	Islip,	*Engineering*
Smith, Samuel McKee,	Winfield,	*Philosophy, Opt.*
Stevenson, John Chiles Houston,	St. Louis, Mo.,	*Philosophy*
Sutherland, William Howard,	La Porte, Ind.,	*Science*
Thacher, Cornelius Stephens,	Hopewell,	*Engineering*
Thomas, Howard,	Stowe, Vt.,	*Engineering*

Thomas, Martha Carey,	Baltimore, Md.,	*Arts, Opt.*
Tyndale, Hector Hilgard,	Springfield, Ill.,	*Science, Opt.*
Van Dusen, Edith May,	Geneva,	*Literature, Opt.*
Van Vleet, De Forest,	Candor,	*Science*
Viegas-Munis, Joaquim,	Piracicaba, Brazil,	*Engineering*
Ware, Lyman Eugene,	Wrentham, Mass.,	*Mechanic Arts*
Wason, Charles William,	East Cleveland, O.,	*Mechanic Arts*
Waterman, John Sayles,	Cumberland Hill, R. I.,	*Mechanic Arts*
Weeks, Frank Peters,	Pittsburg, Pa.,	*Natural History*
White, Hamilton Saulisbury,	Syracuse,	*Science, Opt.*
Wilcox, David James,	Leon,	*Literature, Opt.*
Wilson, Charles Forsyth,	Ithaca,	*Philosophy*

IN THE SECOND YEAR OR SOPHOMORE STUDIES.

Abrams, Alva Elnathan,	Schenectady,	*Science, Opt*
Albertson, Jonathan White,	Hertford, N. C.,	*Engineering*
Ames, Charles Wilberfore,	Germantown, Pa.,	*Literature, Opt.*
Babcock, John Wesley,	Jamestown,	*Arts*
Ballard, Alfred Hovey,	Syracuse,	*Science*
Ballard, Samuel Thruston,	Louisville, Ky.,	*Science, Opt.*
Barnes, Fannie Bates,	Pawtucket, R. I.,	*Science*
Beahan, Willard,	Watkins,	*Engineering*
Beardsley, Arthur Eugene,	Cayuga, Ill.,	*Natural History*
Benchley, Paul Zeno,	Ithaca,	*Agriculture*
Biggs, Chauncy Pratt,	Trumansburg,	*Science*
Bissell, Frank Edward,	South Bend, Ind.,	*Engineering*
Boardman, George Edgar,	Syracuse,	*Arts*
Borden, James McKee,	Washington, D. C.,	*Mechanic Arts*
Borden, John,	Chicago, Ill.	*Science*
Borden, Thomas Paschal,	Denver, Col.,	*Engineering*
Botsford, Anna,	Otto,	*Science, Opt.*
Bradford, Edith Woodman,	Boston, Mass.,	*Science, Opt.*
Breed, William Bradley,	Phoenix,	*Chemistry, Opt.*
Brown, Andrew Wallace,	Newark, N. J.,	*Architecture*
Brownlee, James Corson,	W. Alexander, W. Va.,	*Science, Opt.*
Bruen, Frank,	Dayton, O.,	*Engineering*

Burdsall, Ellwood,	Port Chester,	*Mechanic Arts*
Burdsall, Richard Howard,	Port Chester,	*Science*
Cady, Daniel Wayland,	Peterborough,	*Arts*
Carey, Eugene,	Dunkirk,	*Science, Opt.*
Chapman, Elbridge Gerry,	Canandaigua,	*Arts, Opt.*
Church, Frederick William,	Aylmer, Canada,	*Chemistry*
Clarke, Franklin Price,	Kansas City, Mo.,	*Science, Opt.*
Clary, Walter Ware,	Syracuse,	*Literature*
Cobb, Horace Hamilton,	Andover,	*Science, Opt.*
Cole, Willoughby,	San Francisco, Cal.,	*Science, Opt.*
Conant, Heywood,	Wilmington, Del.,	*Science*
Crandall, Clayton,	Ithaca,	*Natural History, Opt.*
Curtis, John Milton,	Denver, Col.,	*Science*
Davis, Delamore Leon,	Salem, O.,	*Science, Opt.*
Demorest, Henry Clay,	New York City,	*Science*
Detwiler, George Knabb,	Toledo, O.,	*Architecture*
De Witt, Bessie Bell,	Owego,	*Arts*
Dickson, Gilbert John,	Brushland,	*Science*
Doggett, William,	Niagara Falls,	*Arts, Opt.*
Dunning, Edgar Francis,	New York City,	*Engineering*
Dyson, James,	New Britain, Ct.,	*Engineering, Opt.*
Eaton, George Penston,	Oxford,	*Science, Opt.*
Edwards, William Seymour,	Coalburg, W. Va.,	*Engineering*
Ellis, Edwin Murray,	Vineland, N. J.,	*Science, Opt.*
Ely, William Caryl,	East Warsaw,	*Literature, Opt.*
Everson, Charles Brown,	Syracuse,	*Engineering, Opt.*
Fleming, George Claudius,	Ithaca,	*Arts, Opt.*
Grant, Jesse Root,	Washington, D. C.,	*Engineering*
Green, Edward,	Utica,	*Mechanic Arts*
Hadley, Floyd Joseph,	Westville Centre,	*Literature, Opt.*
Hale, Frederic Albert,	Rochester,	*Architecture*
Haley, William,	Honesdale, Pa.,	*Science*
Heermans, Forbes,	Syracuse,	*Mechanic Arts*
Hill, John Thomas,	Warren, Pa.,	*Mechanic Arts*
Hurlbut, De Loss,	Genoa,	*Science, Opt.*
Irwin, Frank Jackson,	Goshen, Ind.,	*Science*
Jackson, Lora Coates,	Wilmington, Del.,	*Science*

Jarvis, James Lorenzo,	Canastota,	*Nat. Hist. Opt.*
Johnson, Ben,	Ithaca,	*Mechanic Arts*
Jones, Horace Tuttle,	Ovid,	*Chemistry*
Jones, Lisette Frances,	Ilion,	*Science*
Jordan, Mary Eudora,	Gainsville,	*Natural History, Opt.*
Kasson, Myron Cassius,	Woodstock, Ill.,	*Agriculture*
Kendall, Franklin Mason,	Attica,	*Science*
Kerr, William Ogden,	Greenville, O.,	*Science*
Kingsbury, Joseph Thomas,	Salt Lake City, Utah,	*Chemistry*
Lewis, John,	Ithaca	*Mechanic Arts*
Lockwood, Benjamin Coulson,	Matamoras, O.,	*Engineering*
Mahoney, John James,	Albany,	*Science*
Mann, Frank Weston,	Norfolk, Mass.	*Science*
Martin, Daniel,	Williamstown, Vt.	*Arts, Opt.*
McIntire, George Alexander,	New York City,	*Science, Opt.*
McKay, William Lincoln,	Elmira,	*Arts*
Meeker, Frank Oliver,	Franklin, Wash. Ter.,	*Science*
Mello-Souza, Pedro de,	St. Paulo, Brazil,	*Engineering*
Merrill, Thomas Davis,	Saginaw City, Mich.,	*Engineering*
Mitchell, Frances Henrietta,	Philadelphia, Pa.,	*Literature*
North, James Dayton,	New York City,	*Science, Opt.*
Oettiker, James,	Belmont, Wis.,	*Science, Opt.*
Otis, Philip Arthur,	Leeds, Mass.,	*Mechanic Arts*
Painter, William Pusey,	Muncy, Pa.,	*Literature, Opt.*
Palmer, Lynde,	Plattsburgh,	*Science, Opt.*
Pangburn, Truman Fairchild,	Ithaca,	*Literature, Opt.*
Patrick, Charles,	New Philadelphia, O.,	*Science*
Pattin, William Bernice,	Fort Plain,	*Science, Opt.*
Phillips, Franklin,	Newark, N. J.,	*Mechanic Arts, Opt.*
Pickett, William Passmore,	Litchfield, Ct.,	*Science*
Pitcher, Mary Merrill,	Owego,	*Arts*
Putnam, Ruth,	New York City,	*Literature*
Reeves, Arthur Middleton,	Richmond, Ind.,	*Science*
Rexford, Charles Myron,	Watertown,	*Arts*
Ribeiro, Quintiliano Nery,	Minos-Geraes, Brazil,	*Architecture*
Richardson, Jeremiah Albert,	Brooklyn,	*Architecture*
Rodriguez, Francisco Valdes,	Havana, Cuba,	*Engineering*
Rohde, Hans Friedrich,	Fraer, Iowa.,	*Literature, Opt.*

Russell, Joseph Grandin,	Santa Cruz, Cal.,	*Mech Arts, Opt.*
Savage, John,	Bay City, Mich.,	*Chemistry, Opt.*
Seaman, William Kelly,	Newburgh,	*Mechanic Arts*
Sellers, Elias Horning,	Fentonville, Mich.,	*Arts, Opt.*
Shaffer, Cicero,	Newfield,	*Science*
Shearer, James Buchanan,	Bay City, Mich.,	*Science*
Sibley, Edwin Henry,	Franklin, Pa.,	*Science*
Smith, Albert William,	Westmoreland,	*Mechanic Arts*
Smith, Edwin,	Franklin, Pa.,	*Mechanic Arts*
Smith, William Judson,	Syracuse,	*Agriculture*
Stead, Henry Howard,	Salisbury Mills,	*Literature*
Stevens, Henry Lee,	Montfort, Wis.,	*Natural History, Opt.*
Sturges, Harold,	Geneva Lake, Wis.,	*Architecture*
Sutton, William John,	Walkerton, Can.,	*Mechanic Arts, Opt.*
Tarbox, Paul Walter,	Hamilton, Can.,	*Science*
Thompson, John Fremont,	Candor,	*Science, Opt.*
Thompson, Phineas Herd,	Turners,	*Engineering*
Thornburg, Frank,	Clinton, Ia.,	*Science*
Throop, William Bryant,	Hamilton,	*Engineering, Opt.*
Tibirica, José Piratininza,	S. Paulo, Brazil,	*Mechanic Arts*
Tiffany, Charles Otis,	Coxsackie,	*Agriculture, Opt.*
Tiffany, Joseph Burr,	Coxsackie,	*Architecture*
Treman, Robert Henry,	Ithaca,	*Mechanic Arts*
Turner, Henry Ward,	Vineland, N. J.,	*Natural History, Opt.*
Van Houten, Chauncey,	Ithaca,	*Science, Opt.*
Van Norman, Harvey Justin,	Jasper,	*Science*
Vasconcelles, Augusto Cezar de,	Rio de Janeiro, Brazil,	*Mechanic Arts*
Volkman, Arthur Ludwig Karl,	New York City,	*Architecture*
Wakeley, Arthur Cooper,	Omaha, Neb.,	*Literature*
Ward, George Franklin,	Marietta, O.,	*Literature, Opt.*
Weed, Watson,	North Rose,	*Science*
Welker, Philip Albert,	Toledo,	*Engineering*
Wilcox, Wallace Jay,	Ithaca,	*Mechanic Arts*
Wilson, Francis Manly,	Ithaca,	*Arts, Opt.*
Winans, Henry Darius,	Ithaca,	*Science, Opt.*
Woodward, Julius Hayden,	Brandon, Vt.,	*Science*
Yager, Willard Everett,	Oneonta,	*Literature*
Youngs, Frank Howell,	Bridgehampton,	*Science*

IN THE FIRST YEAR OR FRESHMAN STUDIES.

Abbott, William Pratt,	Utica,	*Science, Opt.*
Adams, Ewing Hildreth,	Cleveland, O.	*Science, Opt.*
Aldrich, Pliny Sexton,	Palmyra,	*Science, Opt.*
Armour, John,	La Salle, Ill.,	*Science, Opt.*
Bacon, Charles Putnam,	Hartford, Ct.,	*Philosophy*
Bailey, Henry,	Caughdenoy,	*Science*
Baker, George Titus,	Iowa City, Ia.,	*Engineering*
Bakes, Robert Owen,	Vevay, Ind.,	*Agriculture*
Barros, Francisco Fernando de	S. Paulo, Brazil,	*Science, Opt.*
Bartlett, Eugene Moe,	Philadelphia, Pa.,	*Science, Opt.*
Bickham, William Strickle,	Dayton, O.,	*Literature*
Bissinger, William,	New York City,	*Science, Opt.*
Blake, Charles Willis,	Waterport,	*Science*
Bonsall, Charles Sumner,	Salem, O.,	*Mechanic Arts*
Boyle, William Campbell,	Salem, O.,	*Science, Opt.*
Brashear, William Galbraith,	Franklin, Pa.,	*Engineering*
Brunton, Ines,	Centralia, Ill.,	*Science, Opt.*
Buchman, Albert,	New York City,	*Architecture*
Caldwell, Frank,	New York City,	*Science, Opt.*
Cane, Abraham,	Plattsburgh,	*Arts, Opt.*
Chermont, Theodosio Lacerda,	Pará, Brazil,	*Engineering, Opt.*
Church, John James,	Aylmer, Canada,	*Mechanic Arts, Opt.*
Coffin, Harold Lewis,	Manchester, Eng.	*Science, Opt.*
Conde, Mary Frances,	Amsterdam,	*Science*
Cook, Charles Button,	Buffalo,	*Engineering*
Cooper, Louis Napoleon,	Crockett, Texas,	*Science, Opt.*
Corbett, Flora Josephine,	Clayville,	*Literature, Opt.*
Cornell, Elizabeth Percival,	Willow Creek,	*Architecture*
Culbertson, Cordelia,	Girard, Pa.,	*Science, Opt.*
Culver, Wilmer Horace,	Bay City, Mich.,	*Mechanic Arts, Opt.*
Cummings, Frederic Douglas,	Tully,	*Science*
Dewey, Alice Frances,	Attica,	*Science*
Dounce, George Alexander,	Elmira,	*Arts, Opt.*
Easterbrooks, Susie Gallowhur,	Girard, Pa.,	*Science, Opt.*
Eddy, Rosalie Clair,	Forestville,	*Literature*

Edgerton, Sidney Carter,	Akron, Ohio,	*Science, Opt.*
Emery, John Godfrey,	Bay City, Mich.,	*Science*
Falkenau, Arthur,	New York City,	*Mechanic Arts*
Fegan, Charles Paden,	Clinton, Iowa,	*Chemistry*
Ferguson, Daniel Ambrose,	Batavia,	*Engineering*
Ferguson, Nicholas Ephraim,	Stockholm, N. J.,	*Engineering*
Finch, Robert Brooks,	Ithaca,	*Science, Opt.*
Fleischman, Adolph,	Albany,	*Architecture*
Fleming, Minnie Miranda,	Ithaca,	*Literature, Opt.*
Folsom, Emerson,	Zanesville, O.,	*Engineering*
Foote, Hubert Townsend,	New York City,	*Mechanic Arts*
Forbes, Lewis Eugene,	Mayville, Wis.,	*Science, Opt.*
Force, Lafayette,	Tekama, Neb.,	*Science*
Gelatt, Roland Bernard,	Keokuk, Iowa,	*Literature, Opt.*
Gibson, Stambord Jay,	South New Berlin,	*Science*
Gifford, Harold,	Milwaukee, Wis.,	*Natural History*
Gokey, William Noah,	Addison,	*Science, Opt.*
Gould, Charles Asahel,	Newtonville, Mass.,	*Arts*
Green, Hattie Lucina,	South Byron,	*Science*
Gregg, Arthur Samuel,	Ithaca,	*Science, Opt.*
Gregory, Edgar Warren,	Palmyra,	*Mechanic Arts*
Grohs, Minnie Catharine,	Troy, Pa.,	*Science*
Gutheim, Meyer,	New Orleans, La.,	*Literature, Opt.*
Haight, James Augustus,	Oshkosh, Wis.,	*Arts*
Hallett, Jones Clay,	Pompey,	*Arts*
Hallowell, Charles Edward,	Philadelphia, Pa.,	*Science, Opt.*
Hamilton, John Foster,	New York City,	*Science*
Haskell, Eugene Edwin,	Forestville,	*Engineering*
Hathaway, Arthur Safford,	Decatur, Mich.,	*Science*
Havens, Rodman Wesley,	Ellenburgh,	*Engineering*
Head, Anna Louisa,	Germantown, Pa.,	*Literature*
Hicks, Margaret,	Syracuse,	*Architecture*
Hill, Samuel,	Minneapolis, Minn.,	*Literature*
Hinkley, Charles Watson,	Chicago, Ill.	*Science, Opt.*
Hixson, Joseph Foster,	Ithaca,	*Mechanic Arts*
Hoagland, Wilson,	Fort Wayne, Ind.	*Science*
Hogg, Nathaniel Breading,	Brownsville, Pa.,	*Science*
Howland, Edward Cole,	Poughkeepsie,	*Literature, Opt.*

Hoxie, Nathaniel,	New York City,	*Science, Opt.*
Hoxie, Susan,	Scipioville,	*Science, Opt.*
Huntington, Samuel Willis,	Platteville, Wis.,	*Literature, Opt.*
Hurn, John Matthew,	Philadelphia, Pa.,	*Science, Opt.*
Huss, George Morehouse,	Tiffin, Ohio,	*Literature, Opt.*
Hyde, Charles Howell,	Wolcott,	*Science*
Ingalls, Willis Arnold,	Peterboro,	*Science*
Ingraham, William Shurtleff,	Bristol, Ct.,	*Mechanic Arts*
Jackson, Marcellus Cartright,	Delhi,	*Philosophy, Opt.*
Jones, Alfred Edwin,	Granby,	*Science*
Kane, Michael Nolan,	McLean,	*Literature, Opt.*
Kappes, Henry Wyman,	Indianapolis, Ind.	*Science*
Kennedy, James Carroll,	Troy, Vt.,	*Engineering*
Kent, Robert Streator,	Bay Ridge,	*Science*
Kerr, Walter Craig,	St. Peter, Minn.,	*Mechanic Arts*
Kimball, Alice,	Davenport, Iowa,	*Science, Opt.*
King, Henry Wilson,	North Brookfield, Mass.,	*Literature*
King, William Walter,	Warren, Ohio,	*Mechanic Arts*
Knapp, Charles Langdon,	Lowell, Mass.,	*Architecture*
Kozima, Noriyuki,	Tokio, Japan,	*Architecture*
Kratz, Oliver Swarthey,	Chalfont, Pa.,	*Science*
Kueffner, Otto Geo. Fred. Henry,	St. Louis, Mo.,	*Literature, Opt.*
Lafee, Mark Harry,	Dayton, Ohio,	*Architecture*
Lamprecht, George Oscar,	Cardington, Ohio,	*Science*
Landon, Eugene Ashbel,	South Vineland, N. J.,	*Engineering*
Law, Levi Jefferson,	Salem, Mass.,	*Science, Opt.*
Lehman, Sigmund Mayer,	New York City,	*Science*
Litchfield, Cornelius Allen,	Turin,	*Science, Opt.*
Logan, Kate Tappen,	Morristown, N. J.,	*Philosophy*
Lowenbein, Ernest,	New York City,	*Science, Opt.*
Lucas, Charles Otho,	Greenville, Ohio,	*Science*
Ludlow, Rodney Forrest,	Springfield, Ohio,	*Science*
Lyon, Frank,	Binghamton,	*Engineering*
Macy, Ervin Barnes,	Port Byron,	*Science*
Magner, Edmund,	Andover,	*Science*
Mason, John Park,	Brooklyn,	*Mechanic Arts, Opt.*
McDermid, Henry Angus,	Hillsdale, Mich.,	*Mechanic Arts*
McEwan, James Fraser,	Bay City, Mich.,	*Engineering*

McGraw, Joseph Willis,	Ithaca,	*Science*
McKay, Charles Leslie,	Appleton, Wis.,	*Natural History*
McMackin, Amasa Brown,	Newcomerstown, Ohio,	*Engineering*
Mellen, Delos Carpenter,	St Louis, Mo.,	*Philosophy, Opt.*
Mellen, George Holman,	Springfield, Ohio,	*Science, Opt.*
Mendez, Octaviavo Abdon Pereira,	S. Paulo, Brazil,	*Science, Opt.*
Mersereau, Charles Vernon,	Union,	*Engineering*
Meschutt, George Frederic,	Jersey City, N. J.,	*Agriculture, Opt.*
Millard, Alfred,	Omaha, Neb.,	*Science*
Miller, Henry Eugene,	White's Valley, Pa.,	*Science, Opt.*
Mills, Hattie May,	Syracuse,	*Science*
Mills, John James,	Ithaca,	*Arts*
Moffat, Edmund Judson,	Chatham,	*Literature*
Montignani, John Ferguson,	Albany,	*Literature*
Morris, David Ellis,	Cincinnati, Ohio,	*Arts*
Morris, Edward Romeo,	Fort Wayne, Ind.,	*Science*
Morse, Everett Fleet,	Ithaca,	*Mechanic Arts*
Morse, Edmund Royce,	Rutland, Vt.	*Literature, Opt.*
Newton, Whitney Treat,	Denver, Col.,	*Science*
Nixon, Charles Elstun,	Cincinnati, Ohio,	*Literature, Opt.*
O'Connell, John Richard,	Barrytown,	*Engineering*
Oliver, William Burton,	Carmansville,	*Mechanic Arts, Opt.*
Olmsted, Allen Seymour,	Leroy,	*Literature, Opt*
Olney, Willard,	Westernville,	*Engineering*
Osterhaus, Arthur Carl,	Overton, Pa.,	*Science*
Parke, Robert Augustus,	Binghamton,	*Mechanic Arts*
Patten, Elsie Belle Mandeville,	Binghamton,	*Literature*
Peck, Lyra Rosalind,	West Bloomfield,	*Science*
Pennock, Charles John,	Ithaca,	*Agriculture, Opt.*
Phelps, Susanna Stuart,	Morrisville,	*Literature*
Philipp, William Bernard,	Cincinnati, Ohio,	*Science*
Pierce, Charles Edwin,	Buffalo,	*Science*
Porter, Luther Henry,	East Orange,	*Agriculture*
Preston, Harold,	Marseilles, Ill.,	*Arts, Opt.*
Randolph, Nathaniel Archer,	Chadd's Ford, Pa.,	*Science, Opt.*
Read, John Barnham,	Salt Lake City, Utah,	*Science, Opt.*
Remsen, Edson Howard,	Little Neck,	*Architecture*
Rich, Edson,	Binghamton,	*Engineering*

Roth, John Christian,	Albany,	*Chemistry*
Russel, Edward	Ithaca,	*Arts*
Russel, Sarah Jackson,	Ithaca,	*Literature*
Sawyer, Seth Hasty,	Bangor, Me.,	*Agriculture*
Scott, James,	Lamson's,	*Science*
Severance, Frank Hayward,	Whitewater, Wis.,	*Science*
Sexton, Allan Farnham,	Ithaca,	*Architecture*
Shearer, Chauncy Hurlbut,	Bay City, Mich.,	*Science*
Sheldon, Herbert Paris,	Perry Centre,	*Natural History*
Simons, Seward Adams,	Buffalo,	*Arts*
Simpson, George Frederic,	Lodi,	*Engineering*
Skinner, Frank Woodward,	Brownville,	*Engineering*
Smith, Edward Charles,	Cincinnati, Ohio,	*Engineering*
Smith, Fred Elias,	Scipio,	*Science, Opt.*
Smith, William Joseph,	Charleston,	*Engineering*
Spaulding, Moses Jay,	East Poultney, Vt.,	*Engineering*
Spencer, James Seymour,	Utica,	*Literature, Opt.*
Spofford, Harry Wiltsie,	Washington, D. C.,	*Literature, Opt.*
Stearns, Frederic Maynard,	Boston, Mass.,	*Science, Opt.*
Stearns, Marah,	Brooklyn,	*Literature, Opt.*
Stevens, Fred,	Attica,	*Mechanic Arts, Opt.*
Sturges, Washington,	Chicago, Ill.,	*Science, Opt.*
Suren, Nathan Hagop,	Marash, Asia Minor,	*Mechanic Arts*
Tarbox, Edward Bassett,	Hamilton, Canada,	*Mechanic Arts*
Thiemeyer, Herman Louis,	Baltimore, Md.,	*Mechanic Arts*
Tidball, John Satterlee,	Fort Monroe, Va.,	*Architecture*
Tidball, Walton Caldwell,	Fort Monroe, Va.,	*Chemistry*
Tomkins, Calvin,	Newark, N. J.,	*Science*
Tripp, Frank Silsby,	Cincinnati, Ohio,	*Mechanic Arts*
Trumbull, Thomas Hooker,	Washington, D. C.,	*Engineering*
Tupper, Leonidas Harvey,	Decatur, Ill.,	*Science, Opt.*
Tuttle, Willis Hastings,	Perry,	*Science, Opt.*
Upson, Charles William,	Tallmadge, Ohio,	*Science*
VanHorne, Lewis Cass,	Zanesville, O.,	*Nat. Hist. Opt.*
Van Stone, Frederick Jonas,	Kincardine, Canada,	*Mech. Arts, Opt.*
Van Wormer, Eve Emma,	Glenville,	*Science*
Warner, James Ward,	Rock Stream,	*Philosophy*
Washburn, Alfred,	Chappaqua,	*Science*

Weed, Addison,	North Rose,	*Engineering*
Weed, Mary Elizabeth,	North Rose,	*Literature*
Weinmann, John Henry,	St Johnsville,	*Natural History, Opt.*
Welles, George Matson,	Elmira,	*Science*
White, Howard Ganson,	Syracuse,	*Science, Opt.*
Whitman, Myron,	Moravia,	*Science*
Whiton, Frederic Jeffrey,	Ithaca,	*Arts*
Wilcox, Frank Nelson,	Ithaca,	*Architecture*
Williams, Gershom Mott,	Newburgh,	*Science*
Wilson, Duncan Campbell,	Beaufort, S. C.,	*Engineering*
Wright, William Terry Jackson,	Chicago, Ill.,	*Science*
Wyckoft, Edwin Morton,	Perry,	*Science, Opt.*
Youmans, Charles,	Winona, Minn.,	*Science, Opt.*
Young, John Henry Weir,	Cold Spring,	*Science*

SUMMARY BY YEARS.

Post Graduates	13
In Senior or Fourth Year Studies	82
In Junior or Third Year Studies	109
In Sophomore or Second Year Studies	135
In Freshman or First Year Studies	201
Undergraduates	529
Total in the University,	542

SUMMARY BY COURSES.

POST GRADUATES		13			
UNDERGRADUATES,	Arts	43,	of whom	14	are optional.
	Literature	48	"	20	"
	Philosophy	17	"	7	"
	Science	200	"	79	"
	Agriculture	17	"	5	"
	Architecture	32	"	none	"
	Chemistry and Physics	16	"	3	"
	Civil Engineering	82	"	5	"
	Mechanic Arts	56	"	9	"
	Natural History	17	"	7	"

Of these, 397 are pursuing some one or another of the courses in the order laid down in the Register, or with only slight departures from it, the others, 132 are entered as optional students.

THE CORNELL UNIVERSITY.

GENERAL VIEW.

FOUNDATION.

The existence of the Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell. On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge of tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts, amounting to several hundred thousand dollars.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation" and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based.

In accordance with the requirements of its charter, the Institution was duly opened on the seventh of October, 1868.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868-69—provides for the support and maintenance of colleges, "where," in the language of the Act, "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches as are related to Agriculture and the Mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated.

THE UNIVERSITY AND THE STATE.

The Act of Incorporation after citing the words of the Congressional Act (declaring the leading purpose of the land grant), adds: "And such other branches of Science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University as the Trustees may deem useful and proper."

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students.

The Trustees of the University have placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four for each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of nearly forty thousand dollars *per annum*.

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Technical Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, or Natural History; or he may, subject to the approval of the Faculty, take an *Optional Course*, under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. No student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which might otherwise occur,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to consult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University; otherwise the student will be compelled to wait and thus lose one year of his scholarship. The successful candidate is subject to the usual entrance examination on arriving at the University. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-four. Of these, the eldest son of the Founder is, by the law of the State, a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of

Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, holds frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings, a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the supervision of the various courses of study, and such duties as generally appertain to an academic Faculty. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties:

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient and Asiatic Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History. Each of these Faculties have special charge of the studies in some one or more of the General Departments of study.

TERMS AND VACATIONS.

The Academic Year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Monday following the tenth day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring Recess, consisting of only three academic days, begins at noon of the Friday next after the twenty-second day of March.

The Spring Term begins on the Tuesday next after the twenty-second day of March, and the instruction for the term begins on the Thursday following, and continues until Commencement, making in all thirty-seven weeks of term-time in the academic year.

For the beginning and ending of terms and vacations of each year, and other matters of detail relating to them, see the Calendar, p. 7 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince misapprehension in regard to its plan and organization. This has rendered the subjoined statements necessary:—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactorily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students from any State or country.* Free instruction for undergraduates, is given only to State Students and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York. But all others are received, whatever may be the State or

country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows:—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers*, some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which result from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

3. *The Prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

RELIGIOUS INSTRUCTION.

The University was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view. It would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

In the University Chapel—the gift of Henry W. Sage—religious services are held, in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. There are, also, daily chapel services, to which students are invited, although none are compelled to attend.

HIGHER EDUCATION OF WOMEN.

It was the wish of the Founder and other influential friends of the University, from the first, that it should be open and its means and facilities for education should be offered to all, irrespective of sex, color, or nationality. And by an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building—the Sage College for Women has been completed and is in readiness for use. There is no separate Course or Department for women students, the Entrance Examinations are the same for them as for the young men and depend upon the course they intend to pursue. Neither are there any separate classes formed for them, the only distinction made is, that a separate building has been provided by the liberality of Mr. Sage for them to live in, if they choose to avail themselves of the opportunity. While the leading object of the movement is perhaps to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course, those who have been chiefly instrumental in making these arrangements, are earnest believers in the co-education of the sexes.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through academy, college, etc., up to the fullest development of educational resources in a well endowed and completely

equipped university, with its technical departments for the useful Arts and its professional schools for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate Degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate Degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its professors, are placed at the service of its own graduates, and of the graduates of like standing from other colleges and universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they have occasion to use in the prosecution of their studies and investigations. Already quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate professor or Special Faculty.

SELF-SUPPORT BY STUDENTS.

Young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and in a very few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. Self-

support, to any extent, requires energy, persistence and sacrifice; and even a skillful mechanic should have some means in reserve, so that his energies in the University will not be diverted from mental to manual labor. Most of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work; but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. The number of young men applying for such labor has constantly exceeded the number that the University is able to employ; and it must be distinctly understood that the University will not *guarantee employment to any student.*

THE UNIVERSITY TOWN.

Ithaca, the seat of the University, is a town of about ten thousand inhabitants, situated at the head of Cayuga Lake, in Tompkins County, New York. It is accessible from the East, South and West by means of the Erie Railway, leaving that road either at Owego, thence to Ithaca by the Ithaca branch of the Delaware and Lackawanna Railway, or at Waverly, from which place the Ithaca and Athens Railroad leads to Ithaca; or passengers can leave at Elmira, and come directly to Ithaca. From the North there are three roads that leave the New York Central (Auburn Branch), one at Geneva, one at Cayuga Bridge, and the third is the Southern Central, which leaves at Auburn, and crosses the Ithaca and Cortland Road at Freeville. Or persons may leave the New York Central at Syracuse, and reach Ithaca by way of Cortland. The Ithaca and Cortland Railroad starts from the immediate vicinity of the University buildings, and connects with the Southern Central Railroad at Freeville, a distance of nine miles, and with the Syracuse and Binghamton Railroad at Cortland, a distance of twenty miles from Ithaca; in the former case reaching the New York Central Railroad at Auburn, and in the latter at Syracuse.

SCOPE OF THE INSTRUCTION.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words:—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

The instruction given in the University is distributed into several Departments, some of which are subdivided into Schools; and out of these Schools and Departments there are made up four General Courses and six Technical or Special Courses, as will be seen more fully below under the head of "Courses of Study."

I. DEPARTMENT OF AGRICULTURE.

The simple requirements for admission to the Course in Agriculture put the advantages which it offers within the reach of every enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in Agriculture before any others who may wish for this work.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the

class-room exercises, the student devotes as much time as can be profitably spared for the purpose, to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

Students in the Department of Agriculture enjoy, in common with all members of the University, the privilege of using the University Library, and of attending any lectures given in the University.

In Practical Agriculture five hours weekly during the senior year are devoted to technical instruction; this time being divided between lectures, reviews, agricultural calculations and farm accounts. Besides this the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

Tuition is *free of charge.* Room-rent may be remitted, at the discretion of the Faculty, provided the student is at the same time doing a reasonable amount of work on the farm to help defray other expenses.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas' "American Fruit Culturist;" Kent's "Landscape Gardening."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Anderson's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius' "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening."

VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:—1. Five lectures a week extending over the entire academic year. 2. Laboratory work on the bones, skeletons,

clastic models, pathological preparations, and parasites of the domestic animals. 3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm, the various systems of organs and functions being taken up in turn and the differences pointed out together with the bearing of these variations on their healthy management and diseased processes. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses, such as draught, speed, endurance, early maturity and propensity to fatten, milking qualities, etc.; to the data for determining the age; to the principles of breeding, of shoeing, etc.

The Second Term is appropriated to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals and of veterinary surgery. The general principles which must guide in all surgical manipulations are stated, the various operations practiced on the domestic animals are described, and these are illustrated when suitable subjects present themselves.

In Veterinary Science an opportunity is afforded to students who desire it, to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study of the School.

Text-Books.—Chauveau's "Comparative Anatomy of the Domestic Animals;" Colin's "Physiologie des Animaux Domestiques;" Marshall's Outlines of Physiology;" Law's "Principles and Practice of Veterinary Medicine and Surgery."

Books of Reference.—Leyh's "Handbuch der Anatomie der Hausthiere;" Gamgee and Law "Anatomy of the Domestic Animals;" Stephen and Seller "Physiology at the Farm;" Goodale's "Breeding;" Low's "Domesticated Animals;" Gamgee's Domestic Animals in Health and Disease;" Percivall's "Hippopathology;" Williams' "Principles and Practice of Veterinary Medicine and Surgery;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Baumeister's "Geburtshülfe;" Rainard's "Parturition;" Delwart's "Parturition;" Fleming's "Veterinary Sanitary Science

and Police;" Reynal's "Traité de la Police Sanitaire;" Miles "On the Foot;" Rey's "Marechalerie;" Bouley and Reynal "Dictionaire de Médicine Vétérinaire."

II. ARCHITECTURE.

The course of study in Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Faculty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practiced in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Any student may attend the lectures on building materials and construction; but, with these exceptions, all students entering the department will be required to pursue the regular course of study, prescribed for the Degree of Bachelor of Architecture.

III. CHEMISTRY AND PHYSICS.

II. SCHOOL OF CHEMISTRY.

The instruction in chemistry begins naturally with the course of lectures on general chemistry to the Sophomore class, and optional laboratory practice in the first term of the same year. This practice will consist in the performance by the student of a series of experiments, contrived and arranged for the illustration of the more general principles of chemistry. The students who have thus far presented themselves for chemical laboratory practice have been, for purposes of convenience, arranged into several classes; and the practice assigned to each class is adapted, as far as possible, to the object to be attained.

Chemical laboratory practice optional for mathematics.—This course of practice was established for the benefit of students who wish to pursue the study of science, without going farther in mathematics than trigonometry. In order that a student may be qualified to take it, he must have attained proficiency sufficient for

graduation in all the mathematics required in the first year in the Course in Science, and in the lectures on chemistry of the first term of the second year, and he must have performed satisfactorily the experimental work of that term.

The total time required for this laboratory practice will be about two hundred and twenty hours, including the time required for introductory practice in the first term; but the satisfactory performance of the work required for this option will not consist simply in spending this amount of time at the laboratory table; the amount and quality of the work done must also be acceptable.

Chemistry as the Senior Speciality.—This affords a good opportunity to those who have taken chemistry as an option for higher mathematics, of becoming still better acquainted with processes of analysis, and of attending the advanced courses of lectures on chemistry; or those who prefer to go on with the higher mathematics are enabled, by taking this chemistry in their senior year, to go over the same ground as in the case of the option for mathematics, and to advance still farther.

The time required will be about three hundred and fifty hours, and in addition to this, the experimental work of the first term in the Sophomore year must have been satisfactorily performed.

Agricultural Chemistry.—The amount of chemistry to be taken in the full course in agriculture is greater than in the shorter one of three years. In the latter case, both the lecture-room and laboratory work are confined to what is more particularly agricultural chemistry; the practice in qualitative analysis is more limited, and the class-room exercises are confined to the lectures on agricultural chemistry. The work in quantitative analysis for all students in the agricultural course is laid out as far as possible with reference to agricultural chemical analysis proper. The student in the four years' course having already had general qualitative analysis, will be able to pass over the agricultural qualitative analysis very rapidly, and will have more time for the much more important and valuable practice of quantitative analysis. The time required for the performance of the agricultural chemical laboratory practice in the full course in agriculture will be three hundred hours, and in the shorter course of three years, three hundred and thirty hours.

Medical Chemistry.—This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Teachers' course.—This is designed for students, not in any particular course in the University, who desire to fit themselves for teaching chemistry in high schools and academies. The practice is much the same in character as that laid down for the option for

mathematics, but more extended, and will require for its satisfactory completion four hundred or five hundred hours.

Students in the laboratory will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices. They will be required before beginning work in the Laboratory to make a deposit with the Assistant Treasurer of a small sum to cover these charges.

Text books and works of reference.—Thorpe, "Inorganic Chemistry;" Barker, "College Chemistry;" Caldwell and Breneman, "Introductory Chemical Practice;" Crafts, "Qualitative Analysis;" Fresenius, "Qualitative Chemical Analysis" and "Quantitative Chemical Analysis;" Caldwell, "Agricultural Chemical Analysis;" Elderhorst, "Blowpipe Analysis;" Kerl, "Probirkunst;" Plattner, "Use of the Blowpipe;" Sutton, "Volumetric Analysis;" Mohr, "Titrirmethoden;" Thorpe, "Quantitative Chemical Analysis;" Rose, "Chimie Analytique;" Burdon-Sanderson, "Handbook for the Physiological Laboratory;" Storer, "Dictionary of Solubilities;" Gmelin, "Handbook of Chemistry;" Miller, "Elements of Chemistry;" Watts, "Dictionary of Chemistry;" Schorlemmer, "Organic Chemistry;" Wurtz, "Dictionaire de Chimie;" Graham-Otto, "Lehrbuch der Chemie. Handwörterbuch der Chemie."

MINERALOGY.

Instruction in Mineralogy by lectures and practical exercises, is given during the third term, and in addition thereto, instruction in blowpipe analysis and in the detection of minerals by means of the blowpipe, may be had during either of the terms of the year.

Course in blowpiping.—This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work, when it becomes necessary to make out the character of a rock or mineral.

II. SCHOOL OF PHYSICS.

The instruction in the general course in Physics begins with the first term of the second year and continues six terms, as follows:—

First term.—Mechanics of solids, liquids and gases. Three exercises per week. *Second and third terms.*—Magnetism and electricity. Two exercises per week. *Fourth term.*—Heat. Two exercises per week. *Fifth and sixth terms.*—Acoustics and optics. Three exercises per week.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference:—Atkinson's Ganot's "Physics," Jamin "Cours de Physique" and "Petit Traité de Physique," Müller "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics," Jenkin "Electricity and Magnetism," Maxwell "Theory of Heat" Schellen "Spectrum Analysis."

Besides the above general course, there will be an opportunity for a few students who wish to make Physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course:—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

IV. CIVIL ENGINEERING.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analysis to the solution of engineering investigations, the professional preparation of the students comprises the following subjects:—Free-hand drawing, machine-shop practice, blowpipe analysis of minerals, geology, elementary and structural, metallurgy; the location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The sphere of action of the Civil Engineer is so broad and diversified, that no educated engineer pretends to be equally well prepared in all the various specialties into which the profession has been subdivided by social necessities and common consent. To

meet the loud demand for special engineering studies, efforts will be made from the beginning of the third year of the course, to allow of option and diversity of special studies, so far as the means at our disposal will allow. In this manner this department will foster the development of special fitness among the various classes of students, who by natural inclination may prefer a more or less extended study of any particular branch of Civil Engineering.

The great subdivisions of the work under this department are:—Hydraulic engineering, railroad engineering, bridge architecture and construction, topographical engineering, industrial engineering and mining engineering.

At present we have no more than general facilities for beginning the education of Industrial and Mining Engineers, and we are not prepared to offer superior inducements to students pursuing these important branches as a specialty. Appropriate chairs for this purpose will be created at an early day.

We can offer, however, a complete theoretical and practical course in Civil Engineering, embracing a thorough treatment of the first four great subdivisions enumerated above.

The course in Topographical Engineering is designed for those students who may find distasteful the investigation of the higher mechanics as applied to civil constructions, and who may show, instead, special aptitude for geodetical work. Since the recent great surveying expeditions sent out by the U. S. government took the field, there has been an incessant demand for men specially fitted for the important duties of the explorer and the geographical engineer; and in the work of our well known U. S. Coast Survey, there is also an ample field for the efforts of properly trained geographers and topographers. To provide for this and similar demands, a special course is now in full operation. It is properly manned by efficient instructors and its equipment of general and special instruments has been collected at great expense and is very complete. During their connection with this department students taking the course in Topographical Engineering will have an opportunity to perform work as accurate and extensive as is done in the actual details of the U. S. Coast Survey, and in the geodetic surveys of European governments.

Besides the above, there is a course in Surveying and another course in Draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading, pen and colored topography, machine drawing, and the use of projection tables.

The degree of Civil Engineer is conferred, on the recommendation of this Faculty, upon those who, having taken the Bachelor's degree, shall have spent two years in additional special studies and actual practice, passed the requisite examinations, and presented a satisfactory thesis.

V. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others.

In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history—and thus to enlarge, by careful reference and reading, their acquaintance with the facts presented by the lecturers. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern civilization.

The School of Political Science, is intended to embrace all the important topics connected with political and social science. At present, courses of lectures are delivered, as will be seen below, on political economy and constitutional law.

The following is a list of the lectures given in this department:—(1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2.) Modern history, and the philosophy of modern history, by President White. (3.) The general and constitutional history of England, by Professor Goldwin Smith. (4.) General history, and the philosophy of history, by Professor Wilson. (5.) History of the United States. (6.) American constitutional history, by Professor Dwight. (7.) Political economy, by Professor Wilson.

VI. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

I. SCHOOL OF THE ANCIENT LANGUAGES.

I. THE GREEK LANGUAGE.

FIRST YEAR.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

SECOND YEAR.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Phoenissae); Æschylus (Septem); Aristophanes (Acharnians).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII, and Curtius' History of Greece, books III and IV; Greek philology and composition: Sophocles (Ajax, Oedipus Coloneus): Plato (Protagoras).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from Pindar and Theocritus.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.* —Cicero (Essays and Letters.) *Third Term*—Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*— Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.* —Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

As the languages in this school are entirely optional and none of them required for any degree conferred by the University, no

course of study has been definitely marked out in any one of them. But instruction will be given in Persian, Turkish, Chinese, Japanese, Sanskrit, Hebrew, and the other Semitic languages as there may be classes of students requiring them. In the department of "Hebrew and Oriental Literature and History" instruction will be imparted chiefly by lectures. The main subject of study will be the literature and history of the ancient Hebrews. As, however, experience shows that the national idea of this people cannot be studied to advantage, in its growth and development, without some knowledge of the relations it bears to those eastern nations by which Palestine was surrounded, a preliminary course of lectures will be devoted to a discussion of such other forms of oriental thought and life as are important in this connection.

For a thorough appreciation of any literature a knowledge of the language in which it is written is indispensable. Those who desire to do so will have an opportunity to study the language of the Old Testament under the direction of the professor of the department. It is to be hoped that in time, sufficient interest in this direction will be developed to warrant the establishment of classes for the Arabic, Syriac, and other cognate languages to the Hebrew, and that Semitic philology in the term's best and widest sense will find a home at the University.

The lectures are delivered twice a week for the present, and only in the Spring and part of the Fall terms. The text-books of the Hebrew class are Deutsch's Hebrew Grammar, and selections from the Hebrew Bible.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the students the principles of grammar and the use of idioms, with a knowledge of pronunciation, so that, at the end of the course, each of them may be able to read any modern work, and to write with some degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term Otto's "French Grammar" is studied. This is completed in the second term, and translation is begun, and is continued through the third term. In the second year French plays are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar; Il "Vero Amica," comedy of Goldoni; Silvio Pellico's "Le Mie Prigoni," and lectures on Italian literature.

Second Year.—Those pursuing a more advanced course will read the "Inferno" of Dante, and attend further lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar in connection with exercises in writing; Moratin's "El Si de Las Niñas," and Cervantes' "Novas Ejemplares,"

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year.*—(Second year in the Course in Science). Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. After the second year of German or the third year in the Course of Science, German is optional.

Third Year.—The reading consists of the first part of Goethe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyeson's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

VII. MATHEMATICS AND ASTRONOMY.

1. THE GENERAL COURSES.

In this department three courses are marked out; one for students in the Technical Courses that are based to a large extent

upon Mathematics, as Architecture, Mechanical and Civil Engineering; another for students in the General Courses—who pursue the study rather as a matter of culture and general information than otherwise, and who are not required to go beyond trigonometry in order to graduate in these courses; and finally a third course for students in the Courses in Agriculture, and Chemistry and Physics, for which no geometry is required as a condition of admission.

The diversity in the objects for which the students of the first and second classes just referred to, pursue their mathematics, no less than the difference in the objects for which they pursue them, make a separation of them into distinct sections, in order to pursue a different method from the very start, an important step in the means towards the accomplishment of the objects they have in view.

(1). The Technical Courses for students in Architecture, Engineering, the Mechanic Arts, etc.

FIRST YEAR.—*First Term.*—Solid geometry. *Second Term.*—Trigonometry. *Third Term.*—Algebra and descriptive geometry.

SECOND YEAR.—*First Term.*—Plane, analytical geometry and descriptive geometry continued. *Second Term.*—Analytical geometry of three dimensions, and calculus begun. *Third Term.*—Calculus continued.

THIRD YEAR.—*First Term.*—Calculus finished, including integral calculus.

(2). The General Courses, namely, the Courses in Science, Arts, Literature and Philosophy.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Solid geometry and conic sections. *Third Term.*—Trigonometry, mensuration and surveying.

SECOND YEAR.—*First Term.*—No mathematics. *Second Term.*—Analytical geometry, plane and solid. *Third Term.*—Calculus, differential and integral.

THIRD YEAR.—*First Term.*—Astronomy, mathematical and physical.

(3). For students in the Courses in Agriculture, and Chemistry and Physics and for such optional students as do not wish to pursue mathematics any further than is implied in the course.

FIRST YEAR.—*First Term.*—Plane geometry. *Second Term.*—Solid geometry. *Third Term.*—Trigonometry and mensuration.

SECOND YEAR.—*Third Term.*—Land surveying, leveling and the laying out of roads and highways.

2. ADVANCED COURSES. (OPTIONAL.)

Advanced courses of study in pure and applied mathematics are offered for resident graduates and special students. For this purpose any student in the Course in Science may substitute mathe-

matics for the astronomy of his first term Junior for the history in the second and third terms of the Junior year and may take mathematics also for his "*specialty*" in his Senior year. Instruction will be given in quaternions, the theory of numbers, least squares, celestial mechanics, and the mathematical theories of light and heat.

In these advanced courses, and in the later portions of the General Course, the use of works in the French and German languages, will often be required.

VIII. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial and Practical Mechanics were early established and filled. Models illustrating mechanical movements, and the various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the same purpose. This department has thus been placed in a condition to do its work in a most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine-shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

The instruction in shop practice embraces the study and construction of gearing and link-work, strength and proportion of parts, accurate surfaces (such as face-plates, straight-edges, right angles, etc.), shop accounts, management, etc.

Besides the Full Course of four years, with is given at length

under the heading "Courses of Study" below, two other Courses have been marked out.

An Optional Course under the direction of the Dean. In this course entrance examinations in Grammar, Geography, Arithmetic and Algebra through Quadratics are required.

Attendance upon ten lectures or recitations per week or their equivalent, in addition to two hours daily practice, two hours daily in drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

A Special Course has been arranged for such young men as have a fair knowledge of the machinist's or pattern-maker's trade, who desire to fit themselves for foremen or leading positions in their business. They may enter the department without passing entrance examinations; but they are required to devote at least five hours per day to shop practice and four hours daily to machine or free-hand drawing, and to take such other exercises as may be prescribed by the Faculty of the department.

On leaving the University a certificate of proficiency and attendance will be granted them.

IX. MILITARY SCIENCE.

By the Act of Congress creating the Land Grant on which the University is founded, and by the Act of the Legislature of the State of New York assigning that land grant to us, it is obligatory on the University to provide for instruction in Tactics and Military Science. In accordance with this, Drill and Military Science have been declared to be "a part of the studies and exercises in all courses of study and in the requirements of all students in the University."

The Course of Military Instruction and Drill, now prescribed, extends through the first and third terms of the first, second and third years in the University, and the second term of the fourth year.

These exercises occur not more than three times a week during the first three years, and do not exceed one hour at a time. During the second term of the fourth year they occur but twice a week, and consist mostly of recitations and lectures in reference to the organization and command of a company and battalion.

The Trustees by a resolution of April 23d, 1875, authorized and instructed the Faculty to make such arrangements that any student may substitute other studies and exercises for the Drill and Military Science thus generally required of him.

Under this resolution the Faculty have decided that two recitations a week, or their equivalent in lectures, laboratory work, or other special work in any of the technical courses, for the students of those courses respectively, shall be regarded as an equivalent for the Drill and Military Science for the terms during which they are due.

In order that any student may avail himself of this permission

to substitute something else for the Drill and Military Exercises, it will be necessary that, at the time of obtaining his registration ticket for the term, he shall signify to the Registrar what he intends to offer as a substitute. If he neglects to do so he will be holden to the performance of his military duties for the term.

All students just entering upon the first term of the first year of their course are especially advised to take the Drill instead of offering any substitute for it. The fifteen recitations per week required of them are of such a character that most students find it as much as they can well do to prepare themselves for, and attend to them, while the Drill, requiring no extra study, will be no more than the amount of mere physical exercise which each student will find it necessary to take in some form or other. The practical military exercises are so ordered as to subserve the purposes of physical culture—an object of vital moment during the critical period of life usually comprised within university years.

All students that take Drill must continue it through the term. They are required to provide themselves after the first term of the first year with the University uniform for drill and parade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe, according to the nature of the case.

The Military Exercises include:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable. (3.) *Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Any student who has satisfactorily performed all the duties thus required of him for the first three years, and who is qualified therefor, will be entitled to a commission, and for the performance of his duties as a commissioned officer during his fourth year he will be entitled to a credit of five recitations per week for one term and, at his graduation, will receive, moreover, a certificate of military proficiency together with his appropriate Diploma,

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field

works; military mining; the attack and defense of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

X. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will afford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

I. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany; field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of systematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the princi-

ples involved in the natural system of classification. The prominent species of each order are also considered, especially those of importance as agricultural, medical, economic, or ornamental plants, or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany.

The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany.

In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required.

In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

2. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

The instruction in this school is as follows:—(1.) A course of lectures on Geology and Physical Geography, delivered during the spring term of the second year. (2.) A course of lectures on advanced structural Geology. (3.) A course on Palæontology, with special reference to the fossil fauna of the vicinity of Ithaca. (4.) Laboratory practice and field work. This is intended to meet the wants of two classes: the special students, who intend to devote their life to Geology or Palæontology, and the general students, more especially those of the Natural History course.

At present, owing to the lack of the requisite geological models, laboratory practice is limited to the study of fossils and rocks. Field work during the term is confined to the study of the geological formations of the vicinity of Ithaca.

The early training of all geological students consists in the personal, critical examination of specimens, the student being required to find out everything for himself, without the consultation of books. On entering the laboratory, one or more good specimens

are placed before him and he is directed to observe, as carefully as possible, all their characters, and record in drawing and writing, in a suitable book, his observations, just as he makes them. Having carefully observed several specimens of more or less nearly related forms, he is required to compare these with one another, and determine what characters are common to all, or what distinguish each. After he has completed this work for himself, he is allowed to consult authorities, and, by comparing his own work with that of a master, test the accuracy of his own results.

The aim of this system is to give the student training by doing a little thorough work for himself. This manner of working is apt to appear tedious to the new beginner, and, just as might be expected, those who are not fitted for palæontological studies fail in making progress, and are weeded out; but the student who possesses requisite ability is sure to become enthusiastic and go rapidly ahead. Students are required to collect the fossils of the vicinity, and to separate the forms without the aid of books, disregarding, to begin with, the names of the species, upon the learning of which he is at first inclined to place too high a value.

After the training of the first year, the special student is recommended to spend a vacation in the investigation of some field, if possible, new to science, and to make and record observations, and collect rocks and fossils, which he must work up on his return to the laboratory. In this way, before the end of his course, he will have had a good, preliminary training and have, at least, commenced original work upon some subject; but he must not expect to graduate, at the end of four years, a finished geologist or palæontologist; and it is earnestly recommended that he should continue special work in the department. as long as possible after graduation.

The University is furnished with a good and rapidly increasing library of geological and palæontological works, and a large collection of fossils and rocks, to which the student may have access.

The training of the laboratory students, who do not intend to become specialists, consists in the examination of fossils and rocks, but the course is more general than that for the special student, and is varied to meet the ability, and, to some extent, the taste of the individual.

3. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1.) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2.) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3.) A course of thirty-five lectures on psychology and æsthetics, by Professor Wilson. In the Winter Term, (1.) A course of thirty lectures on general zoology, by Professor Wilder, and (2.) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3.) A course of fifty lectures upon veterinary medicine

and surgery, by Professor Law. In the Spring Term, (1.) A course of twenty lectures upon comparative anatomy, by Professor Wilder. (2.) A course on economic entomology, by Instructor Comstock. (3.) Lectures on the natural history of man, forming a part of a course in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians are required to dissect, first, the common animals, then monkeys, and afterward human subjects, when they can be procured. Special attention is given to the animals inhabiting Cayuga Lake and the vicinity of Ithaca. Instruction is given in the methods of collecting, preserving and arranging anatomical and zoological specimens.

Books of Reference.—Students are at liberty to select from the following list of works for reading upon the subjects treated of in the lectures:—Flint's "Physiology of Man;" Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's "Physiology and Hygiene." In comparative anatomy—Owen, Huxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies—Wyman ("Symmetry and Homology in Limbs"), Wilder ("Intermembral Homologies.") In zoology—Agassiz ("Essay on Classification," or "Methods of Study in Natural History"), with Tenney ("Manual of Zoology") or Milne-Edwards ("Elements of Zoology"). In economic entomology and ornithology—Packard, Samuels, the New York State Reports, and Riley's Reports on Entomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily pursued a partial or special course, there will be given a certificate, stating the time he has spent, the studies pursued, and his degree of excellence therein. It will be signed by the President of the University and the Dean of the Faculty. A student who has completed the full course of four years, will be recommended for the degree of BACHELOR OF SCIENCE.

XI. PHILOSOPHY AND LETTERS.

1. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of "Wilson's Psychology, Comparative and Human," with lectures.

In the Winter Term of the Junior year the class will have Political Economy.

Spring Term.—Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation. Wilson's "Text-book" will be used with additional lectures and illustrations.

FOURTH YEAR.—*First Term.*—Wilson's "Introduction to the Study of Metaphysics and the History of Philosophy;" with lec-

tures twice a week, on the History of Philosophy and the general progress of human knowledge from the commencement of Greek civilization to the present time.

Second Term.—Moral Philosophy theories or Morals and the development of Moral Sentiments. Dr. Wilson gives lectures also on the Philosophy of History to the Seniors, being a part of the course in "History and Political Science." The lectures occur three times a week, and are intended to explain the rise and progress of civilization, and the causes that have contributed to it.

Third Term.—There is a course of lectures by Dr. Wilson on the American Constitutional and Municipal Law.

2. SCHOOL OF LETTERS.

The study of the English language and literature, including the explanation and illustration of the structure, growth and peculiarities of the language, is incorporated into each of the General Courses.

The School embraces two departments, one of Anglo-Saxon and English Literature, and the other of Rhetoric and General Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, and embraces the following schedule of exercises and lectures:—

In the course in Science:—

No instructions are given by the Professor in this department, until the beginning of the third year.

THIRD YEAR.—*First Term.*—Lectures on the English language and literature, from Chaucer to Milton, inclusive. *Second Term.*—Lectures on the English language and literature, from Dryden to Cowper, inclusive. *Third Term.*—Lectures on English and American literature of the nineteenth century. A Syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric. *Third Term.*—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum,

Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

II. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and for the first year the instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

During the second year the exercises in writing and composition are continued; the subjects varying with the advance of the student.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; to extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also have exercises in lecturing on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR.—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

SECOND YEAR.—Essays with readings in the class and criticism of composition and style.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions; readings from Shakespeare and Burke. *Second Term.*—Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose; orations, essays, and discussions.

MEANS AND FACILITIES FOR EDUCATION.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls are devoted to lecture-rooms. The other halls contain rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING, are the offices of the President, the Treasurer, and the Registrar of the University, and the Faculty Room.

In the NORTH BUILDING is the Hall of the University Literary Societies, where the Young Men's Christian Association also hold their meetings. It contains, moreover, fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE MC GRAW BUILDING.

This building, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone, quarried on the University grounds, but with dressings and cornices of Onondaga gray limestone. In its architecture it corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter containing three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and in the galleries on the second floor are the various museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath

this are the rooms at present occupied by the Department of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University, the nine smaller bells of the McGraw chimes and the great University clock. The interior of the McGraw building is solidly finished with native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professor of Industrial Mechanics, and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE FOR WOMEN.

This is the gift of Honorable Henry W. Sage. It is not a separate department or school, but merely a home or dormitory for women students. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will

accommodate about one hundred pupils. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE SAGE CHAPEL.

This Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require. The discourses spoken of above—under the head of religious instruction, are delivered in this Chapel; and the Daily Morning Prayers of the University are also held here.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above the town. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream, and enter the University campus on the south side.

II. LABORATORIES.

I. THE ANATOMICAL LABORATORY.

The Anatomical Laboratory is in the second story of the McGraw building, adjoining the Museum and lecture-room. In the laboratory are all of the alcoholic collections. Among these are specimens and dissections of the *fishes of Cayuga Lake*; a series of *embryos*, especially of mammals; a series of *brains* of all classes of vertebrates; Brazilian fishes, reptiles and mammals. A large lot of *amphioxus* has lately been received from Italy, and each special student will be enabled to dissect one or more specimens of this, the lowest known vertebrate animal.

2. THE CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in GENERAL Chemistry, and a smaller one for the class in AGRICULTURAL Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors, and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunson filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

3. THE ENTOMOLOGICAL LABORATORY.

The Entomological Laboratory is in the McGraw Building and on the same floor as the Anatomical Laboratory. In it is the collection in Entomology, and the work in this Laboratory is under the guidance of a special instructor. Among its collections are a series illustrating the entire life-history of injurious insects, their transformation, food, parasites, etc.

4. THE GEOLOGICAL LABORATORY.

The Geological Laboratory is in the south wing of the McGraw Building, second story, adjacent to the Geological Museum. It is furnished with tables and means for laboratory work, a very complete collection of specimens and books for reference; there are also a large number of photographs, illustrating geological phenomena, from the Hayden expedition and the Pacific Coast surveys, and other sources.

5. THE MECHANICAL LABORATORY.

The Mechanical Laboratory, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, and a grinding

machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard guages in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam-engine in case of accident to the water power.

6. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but good practical provision for this work has been made. The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illustrative experiments. Several rooms in the South Building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarized light, and photometry. In the Chemical Laboratory Building, a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern-slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Dubosoq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet and a Gramme electro-magnetic machine, made at the University work-shop.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

7. THE DRAUGHTING ROOMS.

There are four Draughting Rooms, fitted up with tables, models, and whatever is needed for the work to be done in them. (1.) The Architectural Draughting Room, in the north wing of the McGraw Building, under the direction of Professor Babcock. (2.) The Engineering Draughting Room, in the north wing of the Chemical Building, under the direction of Professor Fuertes. (3.) The Mechanical Draughting Room, in the Sibley College, under the direction of Professor Morris. (4.) The Free-hand Drawing Room, occupying the third story of the Sibley College, under the direction of Assistant Professor Cleaves.

8. THE GENERAL FARM.

The University farm consists of about 100 acres, exclusive of the experimental farm, the campus, and timber land. A large proportion of this is devoted to the raising of food for the domestic animals. In addition to the animals kept for labor and the production of milk, are a few specimens of the leading breeds of cattle, sheep, and swine, the primary object of which, is class illustration. The object of the system pursued consists in raising to the highest standard the condition of the soil and its productive power. But it is evident that this can be accomplished only by a well defined system of rotation, and years of careful and judicious management.

It is further evident that the high price of labor and of fertilizers are the principal obstacles to be overcome in advanced agriculture. By the more extended use of labor-saving implements and the horse in the operations now so often performed by hand, supplemented by the liberal application of fertilizers and clover, we are sanguine that it may be conducted within the limits of economical labor. The general farm is made supplementary to the experimental, by duplicating the experiments of the latter but on a larger scale.

The statistics of the general farm as well as the experiments are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

The old barns near the University buildings have been repaired and adapted to general farm purposes. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and illustration the best tools of their kind that the market affords.

9. THE EXPERIMENTAL FARM.

Forty acres of the general farm are used in conducting experiments in the rotation of crops, the various modes of cultivation, the value and application of domestic and imported fertilizers, the hardiness, productiveness, and value of the various grains and grasses, and in originating and testing new varieties. To aid in conducting these experiments, a new and commodious barn has been erected, and adapted for that purpose; it will aid for experimentation in feeding domestic animals. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five thousand square feet, is divided into box-feeding stalls, sheep pen,

horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

III. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work and in various languages. From it have been issued the UNIVERSITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

The facilities of the printing office have been increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting, will be provided with work and the means of further instruction.

IV. THE UNIVERSITY LIBRARY.

The University Library contains about forty thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRA-

RY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelley, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible; the first one—Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

V. THE READING ROOM.

The Library is open and accessible to all registered students every week day from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:—

American.—American Journal of Science; Atlantic Monthly; Canadian Monthly; Country Gentleman; The Nation; Monthly Report of the Department of Agriculture; New York Medical Jour-

nal; North American Review; Harper's Magazine; Historical Magazine; Horticulturist; Journal of the Franklin Institute; Official Gazette of the Patent Office; Prairie Farmer; Railroad Gazette; Railway Review; Specifications of Patents; American Bibliopolist; Cornell Review; Journal of the Telegraph; Journal of Social Science; Medical Eclectic; Penn Monthly; Popular Science Monthly; Publisher's Weekly; Unitarian Review.

English.—Academy; Anthropological Review; Athenæum; Blackwood's Magazine; Bookseller; Builder; Chemical News; Edinburgh Review; Engineer; Examiner; Frazer's Magazine; Guardian; Illustrated News; Journal of the Geological Society; Journal of Microscopical Science; Journal of the Royal Agricultural Society; Mechanics' Magazine; North British Review; Notes and Queries; Pharmaceutical Journal; Philological Society's Proceedings; Popular Science Review; Quarterly Journal of Science; Quarterly Review; Saturday Review; Spectator; Veterinarian; Westminster Review.

French.—Annales de Chimie; Annales des Mines; Annales des Ponts and Chausées; Bibliographie de la France; Bulletin du Bibliophile; Bulletin de la Société chimique; Comtes Rendus; Illustration; Journal de l'Agriculture; Journal de l'Anatomie; Journal de Mathématique; Journal de Menuisérie; Nouveiles Annales de Mathématique; Recueil de Médecine Vétérinaire; Revue des deux Mondes; Revue de l'Architecture; Revue politique et littéraire; Revue scientifique; Revue de Zoölogie.

German.—Annalen der Chemie und Pharmacie; Annalen der Physik; Archäologische Zeitung; Archiv für Anatomie; Archiv für das Studium der neuren Sprachen; Chemisches Centralblatt; Fortschritt der Physik; Hermes; Historische Zeitschrift; Illustrirte Zeitung; Im neuen Reich; Archiv für mikroskopische Anatomie; Archiv für pathologische Anatomie; Bauzeitung; Beiträge für Sprachforschung; Bericht der deutschen Chemischen Gesellschaft; Literarischer Wochenbericht; Milch Zeitung; Palæontographica; Petermann's Mittheilungen; Philologus; Polytechnisches Journal; Jahrbuch für wissenschaftliche Botanik; Jahresbericht für Chemie; Journal für praktische Chemie; Journal für Mathematik; Landwirthschaftliche Versuchs-Stationen; Landwirthschaftliches Centralblatt; Literarisches Centralblatt; Repertorium der Thierheilkunde; Repertorium für Experimental Physik; Rheinisches Museum; Zeitschrift der morgenländischen Gesellschaft; Zeitschrift für analytische Chemie; Zeitschrift für bildende Kunst; Zeitschrift für Sprachforschung; Germania vierteljahrsschrift für deutsche Alterthumskunde; Jahrbuch fur Romanische und Englishe Sprache und Literatur; Jahresbericht über die Fortschritte der classischen Alterthumswissenschaft; Journal für die reine und angewandte Mathematik; Mittheilungen über wichtige neue Erforchungen; Zeitschrift für Bauwesen; Zeitschrift für Volkerpsychologie.

VI. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Frères Chrétien, of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern-slides to be used in the camera as illustrating various remarkable buildings and the various styles of architecture.

The architectural department in the University Library is particularly full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modèles Clastiques* of plants, on a magnified scale, by Auzoux, of Paris, and plant models designed and executed by Brendel, of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil

by Professors Prentiss and Hartt and Mr. Derby ; (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh ; (5) A small collection of economic vegetable products.

4. GEOLOGY AND MINERALOGY.

This Museum comprises:—(1) The JEWETT PALÆONTOLOGICAL COLLECTION, embracing a large number of species of fossils, principally from the New York formations, many of which are illustrated by type specimens figured and described in the Reports of the New York State Geological Survey ; (2) A considerable collection of fossils and rocks illustrating the geology of Ithaca and vicinity ; (3) The HARTT COLLECTION of fossils and rocks, mainly from the British Provinces and Brazil, deposited in the Museum ; (4) The collections of fossils and rocks made by Professor Hartt and his party on the two Morgan expeditions to the Amazonas in 1870 and 1871 ; (5) The WARD COLLECTION of casts of fossils, presented to the Museum by Mr. Cornell ; (6) Miscellaneous collections of fossils, rocks and ores, from various parts of the world, obtained through exchange or gift ; (7) A collection of several hundred photographic lantern-slides illustrating the lectures in geology, physical geography and palæontology ; (8) a collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard, on the Amazonas in 1870 and 1871 ; (9) THE SILLIMAN MINERALOGICAL COLLECTION ; (10) A collection of skeletons from the Anglo-Saxon Cemetery at Frilford, England, together with a variety of ethnological relics taken from the same place, the whole presented by Professor George Rolleston, of the University of Oxford.

5. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art at the present time, as well as a collection of curious things pertaining to the department, is being made and will comprise arms of various patterns, shot, shell, and the various kinds of ammunition in use in the army of the United States. It is believed that the student being familiarized with the different articles and their nomenclature, will be enabled to comprehend much better the technical statements of military history ; and if his services are required by the national government this information will be of advantage.

6. TECHNOLOGY.

Besides the models made at the University, the Museum of Technology and Civil Engineering comprises:—(1) A collection of working models in brass and iron, illustrative of mechanical prin-

ciples applied to machinery, and an extended series of photographs for the same purpose, from the establishment of Schröder, of Darmstadt; (2) Another collection of working models in wood and iron, illustrative of intricate mechanical combinations and expedients, made under the direction of Professor Willis, of Cambridge, England, and Professor Rigg, of the College of Mechanics, at Chester; (3) Models illustrative of descriptive geometry, and bridge and roof construction, made by Schröder; (4) The diagrams and charts issued with the sanction of the English Committee of Council on Education; (5) Photographs and models from various sources; (6) A collection of engineering instruments.

7. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoology, which are available for the educational purposes of the University, are made up of the following:—(1) THE GREENE SMITH ORNITHOLOGICAL CABINET, a mounted and classified collection of 362 birds, principally American, made and presented to the University by Mr. Greene Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL COLLECTION, including about twenty-five thousand species; (3) The *Modèles Clastiques* of Dr. Auzoux, of Paris, illustrative of comparative anatomy and physiology; (4) The lithographic charts and diagrams edited by Achille Comte of Paris, and those published under the auspices of the Council of Education at London; (5) A constantly increasing collection of native animals in alcohol, and of preparations illustrating their structure; (6) A collection of insects to which additions are constantly made, specially intended to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoological specimens deposited by Professors Wilder and Hartt.

VII. COLLECTIONS IN THE FINE ARTS.

The foundation of a Museum of the Fine Arts has been laid by depositing in the University, for the use of the Faculty and undergraduates, the following:—(1) A valuable collection of photographs, especially rich in illustrations of architecture and of art applied to manufactures; (2) Paintings in oil, including full length portraits of Professor Goldwin Smith and George William Curtis, by Carpenter, presented by President White; with portraits of Humboldt, Hon. Hiram Sibley, Peter Cooper and Prudence Crandall; (3) Bronze copies of masterpieces of statuary, including three of Michael Angelo's works, two busts by Burton, one of President White, a gift of some friends of the President, and the other of Professor Wilson, a gift of the Students of the University, and an original bust of Lincoln; (4) Many portfolios of engravings illustrative of Christian art, and of the history of art in general, including the publications of the Arundel Society and the Berlin

Museum series, as well as the series of heliotype reproductions of the Gray collection.

There is also quite a collection of busts of distinguished men, of Classic, Gothic, Rennaisance and Modern Sculpture, and architectural ornamentation, made under the direction of the South Kensington Museum, and by Brucciani of London, arranged for the use of students in Free-hand drawing, and for the departments of Architecture and Engineering.

VIII. UNDERGRADUATE SOCIETIES.

The following associations have been formed by the undergraduates:—(1) A Natural History Society; (2) A Chemical Club; (3) An Agricultural Club; (4) An Engineering Club; (5) A Society for Mechanical Engineering; (6) Four literary societies, known as the "Irving," the "Philaletheian," the "Adelphi," and the "Curtis;" and (7) a "Christian Association," meeting Thursday evenings and on Sunday afternoons.

ADMISSION AND GRADUATION.

ENTRANCE EXAMINATIONS.

Candidates for admission must be at least sixteen years of age, and if women seventeen, and of good character. They will be required to pass thoroughly satisfactory examinations in the following subjects:—(1) Geography. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic, and (4) Algebra through Quadratic Equations.

For the courses in ARCHITECTURE, CHEMISTRY and PHYSICS, CIVIL ENGINEERING, the MECHANIC ARTS and the GENERAL COURSE IN SCIENCE, candidates will be further examined in Plane Geometry.

Teachers' Certificates issued by the Superintendent of Public Instruction of New York, and certificates of having passed the Regents' Examination of this State, will be received instead of entrance examinations, in the subjects and parts of subjects named above, so far as they are included in those certificates.

For the Course in NATURAL HISTORY, candidates will be examined also in Plane Geometry; Plane Trigonometry; Allen's Latin Reader, or some equivalent for it, with an adequate amount of grammatical knowledge; and in Greek, the alphabet and enough of the language to enable the student to recognize, analyze and form scientific technical terms.

For the Course in LITERATURE and that in PHILOSOPHY, besides the general entrance examinations, they will be examined in Plane Geometry; in Latin Grammar, including prosody; Composition (Arnold's first twelve chapters); Allen's Reader, or four books of Cæsar's Gallic War; Virgil's Eclogues, Georgics, and six books of the Æneid; six Orations of Cicero.

For the Course in ARTS, or the Classical Course, the examinations will be the same as for the Course in Literature, (including the general entrance examinations,) with the addition of an examination in Greek;* Greek Grammar (Goodwin's is preferred);

* Greek is pronounced at the University, according to the system recommended in the preface to Goodwin's Grammar.

writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; Smith's Smaller History of Greece.

At the Entrance Examination of 1877 and thereafter, the further requirement will be made of all students entering the university, of an examination in (1) Plane Geometry; (2) Physiology (Dalton's, Huxley and Youman's, or Cutter's); (3) Physical Geography and the Metric System.

And for all students entering the Course in Science, Literature, Philosophy, Chemistry and Physics and Natural History, there will also be required French Grammar (Otto's preferred), and the first book of Voltaire's Charles XII, or an equivalent of French reading; or instead of the French, German Grammar (Whitney's or Comfort's preferred), and seventy-five pages of Whitney's Reader, or an equivalent amount of German reading.

For all students entering the Courses in Architecture and Civil Engineering, there will be required, in addition to what is now required, Solid Geometry and Trigonometry, including Logarithms.

For fuller details see fly-leaf facing p. 8.

NATURE OF THE EXAMINATIONS.

Some idea of the character of the Entrance Examinations may be derived from the specimens of examination papers given below. They are in all cases papers that have actually been given to classes when examined for admission, and are but fair samples of what will be given hereafter. And although perfect answers to all the questions are not indispensable, yet a near approach to perfection is required in all cases.

Of the students that have offered themselves for examination in each year, thus far, about fifteen per cent. have been rejected on account of insufficient preparation. And of those that are admitted, a large portion are admitted with conditions to be made up during the term, and this inadequacy of preparation proves in many cases so heavy a burden that the students fall out at the end of the first term, and are obliged to wait another year before they can go on.

Deficiencies are common in all branches; but perhaps the greatest are in the elementary branches, as in English Grammar and Algebra, especially in fractions, exponents and radicals. In the Latin and Greek also they are very great. The one great fault is want of thoroughness and accuracy in the preparatory scholarship.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities, must present certificates of honorable dismission, after hav-

ing passed at least one term's examinations. They will, on such a testimonial, be admitted to the University without further examinations. The testimonial must certify to both good character and good scholarship. Such a testimonial will merely admit the bearer to the University; it will not admit him to any particular advanced standing. On this admission he will be allowed to join any class in any study that requires no previous preparation except the general preparation for admission to the University, as for example, French with the Freshman class, German with the Sophomore.

But if the student desires to join any class in Latin, Greek, advanced French or German, or Mathematics, he must apply to the professor in charge of the department, and undergo such examination as he may require in order to satisfy himself of the student's ability to go on with the class.

Students coming from other colleges or universities, are *in no case* admitted at *once* to any advanced standing as Sophomore, Junior or Senior. The class distinctions indicated by these names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of this University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need to prepare themselves for graduation here, without regard to the class distinctions above alluded to.

After having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, such students may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to,—the Faculty by this act accepting their studies elsewhere as equivalent to what they would have done here if they had entered the University at the beginning of their collegiate course.

DIRECTIONS FOR ADMISSION.

The candidate will first apply to the Registrar, at South University Building.

1. In case he comes from another college or university, with the "Dismissal" above described, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

2. But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations.

The Entrance Examinations will be held on the days indicated in the calendar on the 7th page of the Register.

For the June and September Examinations the appointments are as follows:—

Monday—Mathematics including Arithmetic, Algebra and Plane Geometry, beginning at 10 a. m. and again at 2.30 p. m.

On Tuesday, 9 a. m., Geography, and at 3 p. m. English Grammar.

On Wednesday, 8. a. m., Latin and Greek through the morning.

The January and April Examinations will be held:—

On Tuesday, beginning at 10 a. m., the Mathematical Examinations.

On Wednesday, 8.30 a. m., Latin and Greek, 11 a. m., Geography, and at 3 p. m., English Grammar.

Candidates for admission should be here on the day set and at the hour named for the beginning of the examinations, as each examination is complete by itself, and will not be repeated until the beginning of the next term, except in cases where very urgent reasons have prevented the student's being present at the regular entrance examinations.

After his examinations he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing all the examinations required, and showing to the professor his registration ticket.

In case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examinations, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *No optional or other course will be possible* without some advance beyond the mere entrance examination.

ADMISSION TO AN ADVANCED STANDING.

Students who have prepared themselves for an advanced standing in the University, at academies or public schools, not having entered any other college or university, will be required to pass the entrance examinations. After that they will be in the same relation to their classes as those that have come from other colleges. They will be admitted at first as optional students, and will afterwards pass the examinations for the standing they seek, at the times appointed by the several professors whose classes they propose to enter.

These examinations are required for two classes of cases:—

(1.) Students, who desire to join an advanced class in any Department, as Mathematics, French, German, without intending to graduate, are required, before joining such class, to pass an examination in the studies that have been pursued by that class, in order to test their ability to go on with it.

(2.) Students *intending to graduate* in any course will be required to pass an examination, with the classes in the University, in those studies of the course which they may have pursued elsewhere.

No student, except those who enter on honorable dismission from other colleges at a standard equivalent to the beginning of the third year, will be allowed to register for, or enter upon, the studies of the Junior or Third Year, in any course unless he has completed all the studies of the two previous years in his course, except by the special permission of the Faculty.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate degree in this University, or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular professor or special faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

A schedule of the lectures and exercises for each term is issued at the beginning of the term.

The day next preceding that on which instruction begins is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

Regular chapel service is held on all days of University exercises—Monday, Tuesday, Wednesday, Thursday, Friday. Lectures and class exercises commence at 8 a. m. and continue until 1 p. m. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term. To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

Any student failing to pass the examinations of the First Year in his course will be required to pass the examinations with the class pursuing the same subject, during the next year.

For students who fail to pass the examinations of the Second Year satisfactorily, there will be an examination in the studies of the year on the Monday and Tuesday before the Registration Day in September, of the details of which due notice will be given before the close of the academic year preceding.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is required for continuance in the University, or a marked proficiency in some one of the more general departments of study. And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one or more terms in the University, as a registered student. And all Diplomas will be dated from the time when they are granted.

COMMENCEMENT THESES.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere boys, assuming no farther control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory

practice, each week, and for the term in which Drill is required, either the Drill or two hours of extra study, and that no student is allowed to take an optional course that is not approved by the Faculty as worthy of his time and efforts.

Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without leave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty.

Any student found guilty of intoxication or other gross immorality will be at once dismissed.

And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to re-enter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

THE DEGREE OF BACHELOR.

1. The degree of BACHELOR OF SCIENCE is conferred on

(1) Students who shall have completed satisfactorily the General Course in Science.

(2) Students who shall have satisfactorily completed either of the Technical Courses, that in Chemistry and Physics, or that in Natural History; and a certificate of the Course completed will be attached to the Diploma.

2. The degree of BACHELOR OF LITERATURE is conferred upon such students as have successfully pursued the Course in Literature.

3. The degree of BACHELOR OF PHILOSOPHY is conferred upon such students as have successfully pursued the Course in Philosophy.

4. The degree of BACHELOR OF ARTS is conferred upon such students as have successfully pursued the Course in Arts.

5. The degree of BACHELOR OF CIVIL ENGINEERING is conferred upon such students as have successfully pursued the Course in Civil Engineering.

6. The degree of BACHELOR OF VETERINARY SCIENCE is conferred on those students who have taken the full four years' Course in that department and passed all the examinations satisfactorily.

7. The degree of BACHELOR OF ARCHITECTURE is given to those who have satisfactorily completed the Course in Architecture.

8. The degree of BACHELOR OF AGRICULTURE is conferred on those who have successfully pursued the four years' Course in Agriculture.

9. The degree of BACHELOR OF MECHANICAL ENGINEERING is conferred on those who have successfully pursued the four years' Course in that department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the course leading to it in precisely the same order as it is laid down in the statement of courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register. But very few of those who attempt an optional course succeed in graduating in any course.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are offered.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out, to which all graduates of this or similar institutions may be admitted.

Any candidate who has taken the Bachelor's degree either in Arts or in Science in any college or university whose requirements are equal to our own, may take the Master's degree in the same course after having passed one year in post-graduate studies either at this University, or elsewhere with the consent and approval of the Faculty, on passing his examinations and presenting a satisfactory thesis on some subject within the department of study to which he has chiefly devoted his attention.

2. The degree of DOCTOR OF PHILOSOPHY will be conferred on Bachelors of Arts, Literature, Science, or Philosophy of this University, and on such graduates in the Bachelor's degree of other colleges or universities as shall satisfy the Faculty that they have completed a course equivalent to one of the four General Courses in this University, on the following conditions:—

(1) A knowledge of Latin and Greek equal to what is now required for admission to this University in the Classical Course.

(2) Two years spent at this University after graduation in the pursuit of studies in some post-graduate course, and passing satisfactory examinations in them.

(3) Presenting a meritorious thesis based on some original investigations in one of the departments in which the studies were pursued.

Provided, however, that they have taken their studies in such courses not strictly professional in character, as have been or may hereafter be specifically established for this degree.

3. The degree of CIVIL ENGINEER is conferred upon such Bachelors of Civil Engineering as, after six terms or two years of

additional study and practice, shall have passed the requisite examinations in the School of Engineering.

4. The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of B. V. S., and who shall have passed satisfactory examinations therefor.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Each candidate for an advanced or second degree whose thesis is accepted, and who is successful in his application, will be required to print the thesis at his own expense and present fifty copies to the University.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates or certificates of proficiency, are conferred upon students who have pursued a special course in any branch of knowledge. They are given upon the recommendation of the respective Faculties.

CERTIFICATE OF JOURNALISM.

Although no special course has been arranged in journalism, arrangements have been made for giving special instruction to those who intend to make journalism their profession. These arrangements consist, so far as the University is concerned, in

1. The art of printing. Students will be required to do work at type-setting in its various branches, the reading and correction of proofs, the making up and working off of forms, in the University printing office, under the direction of the Director of the University Press, to such an extent that they will be able to take charge of an office and do book and job work by themselves.

2. Instruction in journalism proper. This will consist of a course of lectures which will embrace the history of the origin, growth and development of the periodical press in Europe and America; notes on the peculiar characteristics of the journals of the different countries, on the relations of different branches of journalistic labor to each other. Practical instruction will also be given on methods of collecting and arranging news, on the proper "make-up" of a newspaper, and so forth.

Besides this, students will be required to study phonography, under an approved teacher, and to acquire some knowledge of telegraphy.

To all students in either of the General Courses who shall have complied with the foregoing conditions there will be given, in addition to the Diploma appropriate to their course, a *Certificate of Journalism*, signed by the University authorities and the University seal affixed, as follows:

1. To all students in the Course in Literature, or in that in Philosophy, who shall have satisfactorily completed the course.

2. For students in the Course in Arts it will be further required that they shall have taken at least one term in French and two in German in their course.

3. Of students who have completed the Course in Science it will be required that they shall have taken all the studies that are in that course in the departments of History, of Languages and of Philosophy and Letters, and shall have prepared themselves, *outside of the University course*, to pass, before the beginning of their fourth or Senior year, a satisfactory examination in Latin Grammar and some Latin Reader, sufficient to enable them to read and translate ordinary Latin sentences.

PAYMENTS TO THE UNIVERSITY.

For State students under the appointment of school commissioners and city boards of education, for students in agriculture pursuing the full course, and for all resident graduates, there is no charge for tuition or use of Library and collections. But for all others the tuition fee is twenty dollars a term.

No matriculation or entrance fees are required; nor is any discrimination made between students coming from other States. The fees for instruction must be paid in advance, at the beginning of each term.

All students are, moreover, held responsible for any injury done by them to the property of the Institution.

Payments to the University, of every kind, are to be made to the Assistant Treasurer at the University office. Parents and guardians are advised to remit the amount of all University bills directly to the Assistant Treasurer.

Each student intending to take laboratory practice in Chemistry must deposit with the Assistant Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

There is a further charge of five dollars for graduating fee to be paid by each student at the time of his taking his first degree.

EXPENSES OF RESIDENCE.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

The following is an approximate estimate of the yearly expenses:—

Fees for instruction, \$20 a term, - - -	\$ 60.00
Room, board, lights and fuel, about - - -	240.00
Total, - - - -	\$300.00

Cascadilla Place, formerly kept by the University as a boarding-house for professors and students, is now rented, to be kept for the same purpose. It is convenient to the University, and board with rooms, fuel, washing, etc., can be had in it at an expense of from five to seven dollars per week.

The Sage College is open as a dormitory and boarding-house for women students only. The cost for board, room rent, fuel and gas-lights will be about \$7.00 per week, to be paid in advance. Washing will be done in the building at the usual rates of charge for such work.

Other items vary with the student's disposition and habits. Text-books and stationery cost from \$20 to \$30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

COURSES OF STUDY.

GENERAL AND TECHNICAL COURSES.

There are four General Courses of study and six Technical Courses. The General Courses aim at general culture and a preparation for the general duties of life and citizenship. The Technical Courses aim to prepare the student for some one special department of active duty. The General Courses are (1) the Course in Science; (2) the Course in Literature; (3) the Course in Philosophy and (4) the Course in Arts or the Classical Course. The Special or Technical Courses are (1) the Course in Agriculture; (2) the Course in Architecture; (3) the Course in Chemistry and Physics; (4) the Course in Civil Engineering; (5) the Course in the Mechanic Arts or Mechanical Engineering, and (6) the Course in Natural History.

These Courses, both General and Technical, are made up of the instruction already described as given in the various departments and schools of the University, combined in different proportions and groupings, as will be seen below.

There are no Optional Courses as such. But students are allowed under certain restrictions and within certain limits to select and arrange for themselves, term by term, the studies they will pursue during the term. If, however, a student intends to graduate or take a diploma of any kind, he should by all means, and at once, enter upon the course that leads to the degree he designs to take.

If, however, one does not intend to graduate he had better become at the outset a *special* student in that one of the general departments or special schools in which most of the studies he wishes to pursue are to be found, and register himself for that department or school. After so doing he will be allowed to take any other studies that are akin or subsidiary to his main purpose in entering the University.

In the following statement of the several courses the figures in parentheses denote the number of exercises per week. The word "or" in italics between two or more studies denotes that they are equivalent for each other and that either of them may be taken at the option of the student.

I. THE GENERAL COURSES.

1. THE COURSE IN SCIENCE.

The Course in Science, leading to the degree of BACHELOR OF SCIENCE, extends through four years, and includes five hours a week, during the last year, devoted to some one science as a speciality. Its peculiar features are the study of Mathematics; of the French and German languages; and of the historical, physical, moral and political sciences. After the completion of the studies of the first and second years, however, the student is allowed, under certain limitations, an option by which he can substitute sciences from the Special Courses for those that are named in the General Course.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra completed (5); French (5); physiology (3); rhetoric and composition (2).

Second Term.—Advanced geometry (5); French (5); zoology (3); rhetoric and composition (2).

Third Term.—French (5); trigonometry and mensuration (5); botany (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5); French (2); chemistry (2); experimental mechanics (3); analytical geometry *or* chemical laboratory practice (3); exercises in rhetoric (1).

Second Term.—German (4); French (3); chemistry (3); electricity and magnetism (2); calculus *or* chemical laboratory practice (4); exercises in rhetoric (1).

Third Term.—German (5); French (3); electricity and magnetism (2); geology (4); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (3); astronomy (5); heat (2); German (3); English literature (1); essays (1).

Second Term.—Political economy (3); German (3); early Roman History (5); acoustics and optics (3); English literature (1); essays (1); structural and economic geology (2).

Third Term.—Logic (3); German (3); acoustics and optics (3); history of the Roman empire (5); English literature (1); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Mediæval history (5); history of philosophy (2); general literature and oratory (3); *specialty* (5).

Second Term.—History (5); moral philosophy (2); general literature and oratory (3); *specialty* (5).

Third Term.—History (5); lectures of non-resident professors; critical analysis of orations with extempore speaking (3); *specialty* (5); preparations for Commencement.

Any student may take German instead of French in the first year, and French instead of German in the second year. It is to be understood, however, that both languages are to be taken to the amount indicated in the above schedule by all students in the Course of Science.

After the completion of the studies of the second year, any student may substitute for any scientific study or for the history in the second and third terms of the third year any other study in any special department of science; the substitution must be made at the begining of each year and approved by the Faculty. The *speciality* prescribed for the fourth year must be taken *during the Senior Year* in some one department of Science, such as agriculture, veterinary surgery, agricultural chemistry, general chemistry, mathematics, mechanics, military science, zoology, botany, geology, etc.

2. THE COURSE IN PHILOSOPHY.

This is designed to be a scientific course of a higher grade than the preceding. By requiring Latin for admission, the same as in the Courses in Arts and Literature, the student is able to acquire the requisite amount of French and German in a much shorter time. His knowledge of Latin, with the mental training gained in acquiring it, is also found to be such a help in comprehending the technical terms and peculiar phraseology of most of the sciences, that he is able to do much more towards a mastery of the broad field of literature, science and history in a course of four years, than he could hope to do without such a preparation. Accordingly provision is made for this higher attainment; and during the third and fourth years of the Course especially, there is more opportunity for optional study than in the Course of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); physiology (3); rhetoric and composition (2).

Second Term.—Geometry (advanced) (5); Latin (4); zoology (3); French (2); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4); French (5); rhetoric and composition (2)

SECOND OR SOPHOMORE YEAR.

First Term.—German (5); French (2); chemistry (2); experimental mechanics (3); analytical geometry *or* chemical laboratory practice (3); exercises in rhetoric (1).

Second Term.—German (4); French (3); chemistry (3); electricity and magnetism (2); calculus *or* chemical laboratory practice (4); exercises in rhetoric (1).

Third Term.—German (5); French (3); electricity and magnetism (2); botany (3); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (3); astronomy (5); science *or* languages (5); essays (1); English literature (1).

Second Term.—Political economy (3); early Roman history (5); science *or* languages (6); essays (1); English literature (1).

Third Term.—Logic (3); geology (4); history of the Roman empire, science *or* languages (6); English literature (1); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Mediæval history (5); history of philosophy (2); general literature and oratory (3); science *or* languages (5).

Second Term.—History (5); moral philosophy (2); literature and oratory (3); science *or* languages (5).

Third Term.—History (5); science *or* languages (3); general literature and oratory (3); lectures of non-resident professors, preparation for Commencement.

3. THE COURSE IN LITERATURE.

The Course in Literature, leading to the degree of BACHELOR OF LITERATURE, extends through four years. It differs from the Course in Arts in requiring no Greek, and is characterized by a larger amount of attention to the Modern Languages and English Literature. Latin is required during the first year of the Course. In the second year, German is required to the extent of one recitation a day. French is also required throughout two terms of the year. After the first year Latin is optional during the Course; and after the second, German, French and other languages, ancient or modern, may be pursued continuously to the end of the Course. After the end of the second year, students in this Course are allowed, at the beginning of each year, to substitute for the studies prescribed in the Course, other studies in the departments of Languages and Letters; the substitution, however, must be approved by the Faculty, and no change in the Course thus arranged can be made during the year.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); physiology (3); rhetoric and composition (2).

Second Term.—Geometry (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4): botany (3); Anglo-Saxon (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5); Anglo-Saxon (3); Latin, physics *or* chemistry (6); exercises in rhetoric (1).

Second Term.—German (4); French (3); early English (3); Latin, physics *or* chemistry (4); exercises in rhetoric (1).

Third Term.—German (5); French (5); Latin *or* physics (4); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (3); French (5); Latin *or* modern languages (4); special literature (2); English literature (1); essays (1).

Second Term.—Political economy (3); history, early Roman (5); Latin, modern languages *or* science (4); special literature (2); English literature (1); essays (1).

Third Term.—Logic (3); Roman history completed (5); Latin, modern languages *or* geology (4); special literature (2); English literature (1); essays (1)

FOURTH OR SENIOR YEAR.

First Term.—Mediæval history (5); history of philosophy (2); Latin *or* modern languages (4); special literature (2); general literature and oratory (3).

Second Term.—History (5); moral philosophy (2); Latin *or* modern languages (4); special literature (2); General literature and oratory (3).

Third Term.—History (5); special literature (2); Latin *or* modern languages (4); general literature (3); attendance upon lectures of non-resident professors; preparation for Commencement

After the completion of the studies of the second year, students in this course may substitute for any study in the department of languages and literature other studies in the same departments; the change must, however, be made at the time of registration for the beginning of the year.

4. THE COURSE IN ARTS.

The Course in Arts, leading to the degree of BACHELOR OF ARTS, extends through four years. It includes the Greek and Latin languages, and is similar to the usual classical course in the other colleges and universities of this country. During the first year no option is allowed in the choice of studies. In the second year everything is optional except Greek and Latin; but the student must take of the optional studies enough to make with the required studies, fifteen hours per week. During the third and fourth years everything is optional except the studies in the departments of Philosophy and Letters. During the first and second years Latin and Greek are required four times a week each; and after that they may be pursued through the two remaining years so as to occupy twelve out of the fifteen hours of recitation per week.

[*Italics denote elective studies.*]

FIRST OR FRESHMAN YEAR.

First Term.—Greek (4); Latin (4); algebra (5); rhetoric and composition (2).

Second Term.—Greek (4); Latin (4); solid geometry (5); rhetoric and composition (2).

Third Term.—Greek (4); Latin (4); trigonometry and mensuration (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Greek (4); Latin (4); exercises in rhetoric (1); *physiology* (3), *French* (5), *German* (5), *mathematics* (5), *chemistry* (2), *experimental mechanics* (3).

Second Term.—Greek (4); Latin (4); exercises in rhetoric (1); *zoology* (3), *French* (5), *German* (5), *early Roman history* (5), *mathematics* (5), *chemistry* (3), *electricity and magnetism* (2).

Third Term.—Greek (4); Latin (4); exercises in rhetoric (1), *botany* (3), *modern languages* (5), *history of the Roman empire* (5), *mathematics* (5), *electricity and magnetism* (2).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (3); essays (1); *Greek* (4), *Latin* (4), *modern languages* (–), *English literature* (1), *mediæval history* (5), *mathematics* (5), *heat* (2), *astronomy* (5).

Second Term.—Political economy (3); essays (1); *Greek* (4), *Latin* (4), *modern languages* (–), *English literature* (1), *mathematics* (–), *acoustics and optics* (3).

Third Term.—Logic (3); essays and criticism (1); *Greek* (4), *Latin* (4), *modern languages* (–), *English literature* (1), *geology* (4), *mathematics* (–), *acoustics and optics* (3).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); general literature (3): ***Greek*** (4), ***Latin*** (4), *modern languages* (–), *pure mathematics* (–), *applied mathematics* (–).

Second Term.—Moral philosophy (2); general literature and modern oratory (3): *Greek* (4), *Latin* (4), *modern languages* (–), *special literature* (2), *history* (5), *pure mathematics* (–), *applied mathematics* (–).

Third Term.—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors: *Greek* (4), *Latin* (4), *history* (5), *modern languages* (–), *pure mathematics* (–), *applied mathematics* (–).

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

ADDITIONAL REQUIREMENTS.

In addition to the studies named in each of the foregoing general courses students are required, in order to take the degree to which it leads, to attend lectures on general agriculture, (hitherto delivered by the late John Stanton Gould,) and the lectures on modern history by President White.

JOURNALISM.

Although no special course in Journalism has been marked out, students wishing to prepare themselves for Journalism or the profession of Law, who nevertheless cannot take a full course of four years, may, with the same qualifications for admission as are now required for the Course in Science, and some elementary knowledge of Latin, arrange for themselves an optional course, that can be completed in two years, which will include (1) one year of French, (2) one year of German, or two years of either or both the above languages, (3) all the studies and exercises in rhetoric, composition, oratory and general literature, (4) most of the studies in moral and intellectual philosophy, including psychology, logic, moral philosophy and the history of philosophy, (5) all the studies in the departments of history and political science.

II. THE TECHNICAL COURSES.

1. THE COURSE IN AGRICULTURE.

This Course comprises the following subjects: 1. The *Chemistry of Agriculture*, including the constituents and chemical agencies of the atmosphere and of water, and the composition of manures. 2. The *Geology of Agriculture*, including the formation of soils, their chemical, physical and economic character, their suitability to different kinds of crops, and the principal geological features of the various portions of the United States as affecting the soils and productions. 3. The *Physics of Agriculture*, including meteorology, or the laws of climate, and of light and heat as influencing plant life. 4. The *Mechanics of Agriculture*, and their application to the various descriptions of implements and labor required on the farm. 5. The *Botany of Agriculture*, including structural botany, vegetable physiology, vegetable pathology, and a knowledge of crops cultivated for food and for technical purposes. 6. The *Zoology of Agriculture*, including the habits, diseases and treatment of live stock, the anatomy of the horse, the cow, the sheep, and other farm animals, and all branches of veterinary surgery and medicine, as well as a special consideration of insects injurious to vegetation. 7. The *Economics of Agriculture*, including the sequence of agricultural operations, the economical division of labor, rearing, feeding and handling of domestic animals, the rotation of crops, the improvement of the soil by manuring, draining and liming, farm engineering and construction, general agricultural policy, and the management of landed property.

Two courses of study are marked out, one of which requires four years for its completion, and leads to the degree of BACHELOR OF AGRICULTURE; the other is an abridged course of three years, comprising all the purely agricultural instruction given in the full course. It is recommended to all who enter the school to take one of these courses of study: but students who have a limited amount of time at their disposal, are at liberty, as in other departments of the University, to select and follow any studies from these courses that they may be qualified to pursue with advantage, provided only that the full number of fifteen recitations per week, or its equivalent, is made up; or, if any person should wish to attend only a partial course of one or more series of lectures, and at the same time to work in the laboratories, or gardens, or on the farm, under the direction of the respective professors in charge, he will be permitted to do so at the discretion of the Faculty. Of such a student it will be required that his time be as fully occupied in study and work as that of other students.

THE FULL COURSE OF FOUR YEARS,

Leading to the degree of Bachelor of Agriculture :—

FIRST OR FRESHMAN YEAR.

First Term.—Drawing, free-hand, nine hours (3); geometry, plane (5); German (5); rhetoric and composition (2).

Second Term.—Drawing, free-hand, nine hours (3); geometry (advanced) (5); German (4); rhetoric and composition (2).

Third Term.—Botany (3); Drawing, linear (3); German (5); trigonometry (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany, agricultural and economic (3); chemistry, general (2); experimental mechanics (3); German (3); physiology (3); tools (1).

Second Term.—Chemistry, general (3); chemical introductory practice, six hours (3); electricity and magnetism (2); German (3); vegetable physiology (or horticulture and arboriculture) (3).

Third Term.—Botany, practice, four hours (2); electricity and magnetism (2); geology (4); German (3); land surveying (3).

THIRD OR JUNIOR YEAR.

First Term.—Botany, practice, six hours (3); chemistry, agricultural (3); practice, nine hours (4); heat (2); veterinary anatomy and physiology (5).

Second Term.—Chemistry, agricultural (3); practice, twelve hours (5); horticulture and arboriculture (or vegetable physiology) (3); veterinary medicine and surgery (5).

Third Term.—Botany, practice, six hours (2); building materials and construction (2); chemistry, agricultural (3); practice, six hours (2); entomology (2); veterinary medicine and surgery (5).

FOURTH OR SENIOR YEAR.

First Term.—Agriculture, lectures (5); practice, six hours (3); entomology (1); geology, practice, six hours (3); history (5).

Second Term.—Agriculture, lectures (5); practice, six hours (2); history (5); political economy (3); rural architecture (1); strength and preservation of materials (2).

Third Term.—Agriculture, lectures (5); practice, six hours (3); constitutional and municipal law (1); history (5); thesis for graduation.

A COURSE OF THREE YEARS.

FIRST OR FRESHMAN YEAR.

First Term.—Chemistry, agricultural (3); free-hand drawing, nine hours (3); geometry, plane (5); physiology (3); rhetoric and composition (2).

Second Term.—Chemistry, agricultural (3); introductory practice, six hours (2); free-hand drawing, nine hours (3); geometry (advanced) (5); rhetoric and composition (2).

Third Term.—Botany (3); chemistry, agricultural (3); practice, four hours (2); entomology (2); rhetoric and composition (2); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany, agricultural and economic (3); chemistry, agricultural, practice, nine hours (4); entomology (1); experimental mechanics (3); veterinary anatomy and physiology (5).

Second Term.—Chemistry, agricultural, practice, fifteen hours (6); electricity and magnetism (2); vegetable physiology, (or horticulture and arboriculture) (3); veterinary medicine and surgery (5).

Third Term.—Botany, practice, four hours (2); building materials and construction (2); electricity and magnetism (2); geology (4); veterinary medicine and surgery (5).

THIRD OR JUNIOR YEAR.

First Term.—Agriculture, lectures (5); practice, six hours (2); botany, practice, six hours (3); heat (2); geology, practice, six hours (3); tools (1).

Second Term.—Agriculture, lectures (5); practice, six hours (2); horticulture and arboriculture (or vegetable physiology) (3); political economy (3); rural architecture (1); strength and preservation of materials (2.)

Third Term.—Agriculture, lectures (5); practice, six hours (2); botany, practice, six hours (2); land surveying (3); constitutional and municipal law (1.)

2. COURSE IN ARCHITECTURE.

The Course extends through four years of three terms each, and leads to the Degree of Bachelor of Architecture.

FIRST OR FRESHMAN YEAR.

First Term.—Solid geometry (5); French *or* German (5), rhetoric (2); hygiene, six lectures; free-hand and linear drawing.

Second Term.—Trigonometry (5); French *or* German (5); Rhetoric (2); free-hand drawing; projection and tinting.
Third Term.—Algebra (5); descriptive geometry (3); French *or* German (5); rhetoric (2); isometrical projection and shading.

SECOND OR SOPHOMORE YEAR.

First Term.—Descriptive geometry (4); French *or* German (3); chemistry (2); physics (2); analytical geometry (3).
Second Term.—Calculus (4); French *or* German (3); chemistry (3); physics (2); draughting.
Third Term.—Building materials and construction (2); German (3); botany (3); physics (2); draughting (2); free-hand drawing (3).

THIRD OR JUNIOR YEAR.

First Term.—Shades, shadows and perspective (3); mechanics (3); heat (2); lectures on Egyptian, Greek, and Roman architecture (3); draughting.
Second Term.—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (5); optics and acoustics (3); draughting.
Third Term.—Geology (4); optics and acoustics (3); lectures on Gothic architecture (5); free-hand drawing (3).

FOURTH OR SENIOR YEAR.

First Term.—Lectures on renaissance architecture (3); lectures on composition and the art of designing (2); designing (10).
Second Term.—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (2); designing (10).
Third Term.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., (3); designing (9); preparation of thesis.

3. THE COURSE IN CHEMISTRY AND PHYSICS.

The instruction given in this Course occupies twelve terms. No special degree has been established for this course. But students who have completed it are entitled to the degree of Bachelor of Science, with a certificate of the course they have completed.

The work in this course may be completed by taking three hours per week in the first term of the Sophomore year, and eight hours during the other terms of that year, and twenty or twenty-five hours per week during the Junior and Senior years. For graduation in this course it is expected that the student, besides comply-

ing with the usual conditions for graduation, will take the full course in physics, including laboratory practice and photography, and other studies sufficient to make up at least six hours of recitations or lectures a term, besides his chemical work.

FIRST OR FRESHMAN YEAR.

First Term.—French (5); geometry, plane (5); physiology 3); rhetoric and composition (2).

Second Term.—French (5); geometry (advanced) (5); rhetoric and composition (2); zoology (3);

Third Term.—Botany (3); French (5); rhetoric and composition (2); trigonometry and mensuration (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry (2); chemical practice, introductory, four hours (2); experimental mechanics (3); French (5); German (5.)

Second Term.—Chemistry (3); chemical practice, qualitative analysis, ten hours (4); electricity and magnetism (2); French (3); German (4).

Third Term.—Chemical practice, qualitative analysis, including blowpiping, twelve hours (5); electricity and magnetism (2); geology (4); German (5).

THIRD OR JUNIOR YEAR.

First Term.—Chemical philosophy (3); chemical practice, quantitative analysis, twenty hours (8); German (3); heat (2).

Second Term.—Acoustics and optics (3); chemical philosophy (3); chemical practice, quantitative analysis, twenty hours (8); German (3).

Third Term.—Acoustics and optics (3); chemical philosophy (3); chemical practice, quantitative analysis, twenty hours (8); German (3.)

FOURTH OR SENIOR YEAR.

First Term.—Chemical practice, twenty-five hours (10); chemical processes, recent (1); physical practice, ten hours (4).

Second Term.—Chemical practice, seventeen hours (7); physical practice, ten hours (4); metallurgy, including assaying (3), mineralogy, in alternate years (3); organic chemistry (1).

Third Term.—Chemical practice, seventeen hours (7); chemical technology (2); physical practice, ten hours (4); thesis for graduation.

4. THE COURSE IN CIVIL ENGINEERING.

The full course of Civil Engineering extends through four years, and leads to the degree of Bachelor of Civil Engineering. (B. C. E.)

The whole course has for its object to lay a substantial foundation for disciplinary culture, mainly technical; and the last four terms are devoted to engineering specialties.

FIRST OR FRESHMAN YEAR.

First Term.—Solid geometry (5); French *or* German (5); rhetoric and composition (2); free-hand drawing; six lectures on hygiene.

Second Term.—Trigonometry (5); French *or* German (5); rhetoric and composition (2); free-hand drawing; lettering.

Third Term.—Algebra (5); French *or* German (5); rhetoric and composition (2); descriptive geometry (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); descriptive geometry (4); French *or* German (3); chemistry (2); draughting of descriptive geometry problems.

Second Term.—Analytical geometry of three dimensions (2); calculus (3); French *or* German (3); electricity and magnetism (2); chemistry (3); pen topography (2).

Third Term.—Calculus (5); land surveying (3); electricity and magnetism (2); botany (3); machine construction (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); architecture (3); shades, shadows and perspective (3); heat (2); topographical mapping.

Second Term.—Higher geodesy (5); mechanics (5); mineralogy (2); acoustics and optics (3); tinting, graining, draughting details of structures.

Third Term.—Mechanics (5); railroad surveying (5); geology (4); colored topography (2).

FOURTH OR SENIOR YEAR.

First Term.—Spherical and practical astronomy (5); mechanics (5); stereotomy (3); draughting.

Second Term.—Mechanics (5); metallurgy (2); advanced structural geology (2); stone cutting (5); draughting.

Third Term.—Civil engineering (3); bridge construction (5); engineering economy (2); machine shop practice (2); hydrographical mapping; preparation of thesis.

5. THE COURSE IN MECHANIC ARTS.

(1) *A Four Years* or *Full Course*, upon the satisfactory completion of which the student will be entitled to the degree of Bachelor of Mechanical Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Solid geometry (5); French *or* German (5); free-hand drawing and shop practice (5).
Second Term.—Trigonometry (5); French *or* German (5); free-hand drawing and shop practice (7).
Third Term.—Algebra (5); French *or* German (5); descriptive geometry (3); shop practice (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); German *or* French (3); chemistry (2); descriptive geometry (4); shop practice (2).
Second Term.—Analytical geometry of three dimensions (2); calculus (3); German *or* French (3); chemistry (3); electricity and magnetism (2); shop practice (3).
Third Term.—Calculus (5); German *or* French (3); electricity and magnetism (2); machine construction and drawing (2); shop practice (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); shades, shadows and perspective (3); heat (2); rhetoric and composition (2); shop practice (3).
Second Term.—Acoustics and optics (3); machine construction and drawing (4); mechanics (5); rhetoric and composition (2); shop practice (3).
Third Term.—Machine construction and drawing (4); mechanics (5); mill work (4); shop practice (2).

FOURTH OR SENIOR YEAR.

First Term.—Mechanism (5); machine drawing (4); mechanics (5); shop practice (3).
Second Term.—Designing machinery (4); physical laboratory practice (4); steam engine (5); shop practice (3).
Third Term.—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (5).

6. THE COURSE IN NATURAL HISTORY.

As mathematics through plane trigonometry is required for admission to this course it includes no mathematics. Unlike th-

other Technical Courses it requires a knowledge of both languages, French and German. And in the last years of the course it allows an option between either of those great branches of Natural History, Botany, Geology or Zoology.

No special degree has been provided for this course; but students who complete it are entitled to the degree of Bachelor of Science with a certificate of proficiency in Natural History.

FIRST OR FRESHMAN YEAR.

First Term.—French (5); physiology (3); rhetoric and composition (2); free-hand drawing (3); laboratory work in anatomy (2).

Second Term.—French (5); zoology (3); rhetoric and composition (2); free-hand drawing (3); laboratory work in anatomy (2).

Third Term.—French (5); rhetoric and composition (2); botany (3); laboratory work in botany (5).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5); experimental mechanics (3); chemistry (2); systematic botany (3); laboratory work in botany (2).

Second Term.—German (4); electricity and magnetism (2); laboratory practice in chemistry (5); vegetable physiology (3); laboratory work in botany (1); laboratory work in comparative anatomy (1).

Third Term.—German (5); geology (4); laboratory work in botany (3); comparative anatomy (2); laboratory work in comparative anatomy (2).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (3); heat (2); anatomy and physiology of domesticated animals *or* palæontology (5); laboratory work in comparative anatomy (5); essays (1).

Second Term.—Advanced structural geology (2); laboratory work in geology (5); acoustics *or* analysis of soils (3); medicine and surgery of domesticated animals *or* horticulture (5); essays (1).

Third Term.—Entomology (2); laboratory work in entomology (3); optics and photography (5); medicine and surgery of domesticated animals *or* laboratory work in geology (5); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); astronomy (5); general literature and oratory (3); laboratory work (including thesis) in either botany, geology *or* zoology (5).

Second Term.—Philosophy of history (3); general literature and

oratory (2); laboratory work (including thesis) in either botany geology *or* zoology (10).

Third Term.—Logic (3); general literature and oratory (3); laboratory work (including thesis) in either botany, geology *or* zoology (9).

III. OPTIONAL COURSES.

Optional Courses are those which the student may select for himself; and in no course is it necessary, for the attainment of a degree, that the studies should be followed exactly in the prescribed order: and in the General Courses equivalents will be accepted, in some cases, for the studies indicated, provided they are of the same general character.

Any student, however, who intends to graduate at all should by all means select the course that leads to the degree he expects to take, and follow it in the order above laid down; the disadvantages of doing otherwise are so great as to render success almost impossible.

Undergraduates are also permitted, upon proper application to the Faculty, at the beginning of any term, to transfer themselves from one of the General Courses to an Optional Course, or, with the consent of the Faculty concerned, to any Special Course. All the courses have been arranged upon a basis of three lectures or class exercises a day, thus occupying fifteen hours a week; but students who find themselves able to accomplish more than this are allowed to take additional studies. And so too, students who are obliged to labor as a means of self-support are sometimes, upon sufficient reasons shown to the Faculty, excused from attendance upon the full standard number of University exercises. This, however, does not obviate the necessity of completing the entire course before graduating.

IV. POST-GRADUATE COURSES.

No regular post-graduate courses have been marked out by the various Departments of the University. It is found that in most cases, students who desire to spend a portion of time at the University after taking their Baccalaureate Degree, have each of them some one special study to pursue, or object to accomplish, which differs in so many respects from those of any other student, that it is hardly possible to classify them, or to arrange beforehand, in any general way, a course that will meet their wants. Accordingly, the practice thus far has been for the student himself to indicate, on his entering the University, his wishes; and in case the studies he wishes to pursue are not already provided for in the schedule for the term, his application is referred to the appropriate Faculty or to some one professor who is in charge of the department in which his studies are chiefly comprehended, when a course is arranged for him and provision made for his prosecuting it.

EXAMINATION PAPERS.

I. ENTRANCE EXAMINATIONS.

[*The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek, and in Latin an oral examination was added to the written one.*]

ARITHMETIC.

1. Add together 24.6, 35.7 and 80.9; also, add together 1yd. 2ft. 8in. and 2ft. 7in.; and in each example, EXPLAIN THE REASON FOR "CARRYING."

2. The number 123.456 can be read in 33 different ways, of which the following are specimens: "123, and 456 thousandths;" "1 hundred, 2 tens, 3 units, 4 tenths, 5 hundredths, and 6 thousandths;" "123,456 thousandths;" "12 tens, 34 tenths, and 56 thousandths." Give three more of these ways.

3. Explain in full the REASON why $\frac{2}{3}$ of $\frac{4}{5} = \frac{8}{15}$.

4. Find the greatest common divisor of 238 and 553, and GIVE THE REASONING.

5. $\dfrac{2\frac{1}{2}}{3\frac{1}{3}} + \dfrac{5}{6} + \dfrac{0.001 \times 2200}{0.66 \div 0.2} = ?$

6. What sum, put at simple interest at $7\frac{1}{2}$ per cent. per annum, will amount in 3y. 4m. to \$2,500?

7. At what price must 5 per cent. bonds be bought, to realize $6\frac{1}{4}$ per cent interest on the investment?

8. Explain and DEMONSTRATE the rule for cube root; and illustrate by the work for $\sqrt[3]{12,812,904}$.

[*One of the following questions may be substituted for either of the above at the option of the student.*]

9. How many grammes of distilled water, in a rectangular box 0.2 metres long, 5 centimetres wide, and 50 millimetres deep? How many kilogrammes? How many litres?

10. The locomotive of a passenger train has driving-wheels 20 feet in circumference, but in 121 revolutions, they slip back a dis-

tance equal to one circumference. A freight locomotive has drivers $16\frac{1}{2}$ feet in circumference, making 100 revolutions while the drivers of the passenger engine make 121; but in every 33 revolutions they lose one circumference by slipping. When traveling in the same direction, the passenger train gains on the other 10 miles an hour. By how many miles an hour do the trains approach each other, when moving in opposite directions?

ALGEBRA.

1. Multiply $(a - b)$ into $(x - y)$, and EXPLAIN THE REASONS for the signs in your result.

2. What is meant by the third power of a? By the fourth root of a? By $a^{\frac{3}{4}}$? By a^0? By a^{-1}? By $a^{-\frac{3}{4}}$?

3. Why is the square root of a^5 equal to the fifth power of $\sqrt{a}$?

4. Find the Least Common Multiple, and the Highest or Greatest Common Divisor, of $8a^6b^4c^3d^2$, $12b^2c^6d^0$, $30b^3c^5d$, $10ab^7c^4d^0$. Also of $a^3 + b^3$ and $a^2x + 2abx + b^2x - a^2 + b^2$. EXPLAIN THE REASONS for the rules you have used.

5. Simplify and solve the equations

$$2ax = 2c - (1 - (-c + 1)) + ax - by.$$
$$mx + ny = -(p \div (-1)).$$

6. Simplify each term of the following equation, and then find the value of x:

$$\frac{3(2x)^{\frac{1}{2}}(3bx)^0}{(ax)^{-\frac{1}{2}}\sqrt{6a}} + (-2^{ab})^2 = (4^b)^a + \frac{2}{1 + \sqrt{3}} + x.$$

7. Solve the equation $x^2 + 6ax = b$. What conditions must a and b satisfy, in order that the two roots may both be real and positive? Both real and negative? One of each sign? Both imaginary? Equal to each other?

8. State what you can concerning the nature of imaginaries; multiply together $(1 + \sqrt{-1})$ and $(1 - \frac{1}{2}\sqrt{-4})$; and explain.

GEOMETRY.

1. Prove that the angles at the base of an isosceles triangle are equal: and the converse theorem.

2. Prove that if there are two sets of proportional quantities, the products of the corresponding terms are proportional: and the converse.

3. Given two irregular pentagons, construct a pentagon similar to the first and equivalent to the second.

4. Prove that in the same circle, or in equal circles, two angles at the centre have the same ratio as their intercepted arcs. [There are two cases.]

5. Prove that the angle formed by two secants that intersect without the circumference, is measured by half the difference of

the intercepted arcs; and demonstrate two of the chief theorems that are used in the proof of this. What analogous propositions are obtained when one or both of the secants are replaced by tangents, or chords, or both? Which of these can you demonstrate as corollaries of the above?

GEOGRAPHY.

1. Name the rivers of Spain, of France, of Germany, of Italy, of Russia in Europe.
2. How could one go by water from Archangel to Constantinople? From Lyons to Paris?
3. Bound Germany, Italy, Turkey in Europe.
4. Name the rivers of India, of China, of Siberia.
5. How could one go by water from Cairo in Egypt to Canton? From Malta to Glasgow?
6. Bound Persia, Arabia, Afghanistan.
7. Over what countries would one pass in going in a straight line from Pekin to Madrid?
8. Name three principal cities in China, three in India, three in Asia Minor.
9. Name five principal rivers of Africa.
10. In what part of Africa are its ranges of Mountains? Describe them.
11. What productions of Africa form articles of commerce?
12. Bound Uraguay, Paraguay, Bolivia.
13. Name five large rivers of South America and say in what direction they flow.
14. Name the capitals of each of the countries of South America.
15. How could one go by water from Montevideo to Pittsburgh?
16. Bound Kansas, Arkansas, Dacota.
17. How could one go by water from New York to Chicago?
18. Name five large rivers of British North America.
19. Describe the boundary line between British North America and the United States.
20. What States and countries would one pass in sailing from Milwaukie to San Francisco.

ENGLISH GRAMMAR.

1. State the different ways of forming the plural in English nouns.
2. Give the meaning and derivation of the following words: virtuously, autobiography, hospitable, journalist, circumvolution, disenthrall, inconsequent, interlineation, dissatisfy, quadrennial, worthlessness, contemporaneous.
3. Use the word *iron*, (*a*) as an adjective; (*b*) as a noun; (*c*) as a verb.

4. Use the word *for*, (*a*) as a conjunction; (*b*) as a preposition.
5. Explain the meaning of the terms *person, mood*, and *tense*.
6. Parse the italicized words in the following: I know *him as myself: for from our infancy* we have conversed, and *spent* our hours *together*.
7. Define the following terms: *vowel, consonant, diphthong, syllable*.
8. In order to conjugate a verb, what parts must be known?
9. Classify the so-called irregular or strong verbs.
10. Write a sentence in which a phrase or a clause is the subject of a verb.
11. Point out the errors in the following sentences:

(*a*) He laid down in the first place he come to.
(*b*) He has not studied like we did.
(*c*) I had rather go than stay to hear you three persons quarrel with each other.
(*d*) I shan't tell you whom I think is the best man of the two.
(*e*) By no excuse you couldn't justify such conduct.
(*f*) Either in the four first of the class were good scholars.
(*g*) Since you were here, I went out to walk every day.
(*h*) Who did you expect to have seen at the hall?
(*i*) He don't mind me; but I will be sorry to punish him.
(*j*) The third and fifth chapter is very entertaining.
(*k*) The assembly consist of forty-seven members, two elected by nineteen districts, and three by each of the other districts.
(*l*) Be prudent; without which you will get into trouble.

12. Turn into grammatical prose the following verses, placing the words in the natural order, and supplying ellipses:

Meanwhile the south-wind rose, and with black wings
Wide hovering, all the clouds together drove
From under heaven; the hills to their supply
Vapor, and exhalation dusk and moist,
Sent up amain; and now the thicken'd sky
Like a dark ceiling stood; down rush'd the rain
Impetuous, and continued till the earth
No more was seen; the floating vessel swum
Uplifted, and secure with beaked prow
Rode tilting o'er the waves; all dwellings else
Flood overwhelm'd, and them with all their pomp
Deep under water roll'd; sea covered sea,
Sea without shore.

13. What is meant by an *exception?* give several instances of exceptions to rules of grammar.
14. Give a list of Adverbs of irregular comparison.
15. What is meant by one word governing another?

LATIN.

Di, quibus imperium pelagi est, quorum aequora curro,

Vobis laetus ego hoc candentem in litore taurum
Constituam ante aras.

Translate, divide into feet, and give rules for quantities in the first line.

Compare *similis, acer, juvenis, fortis, tenax, diu, male.*

Give all the participles, infinitives and forms of second person singular of *gaudeo* and *fero.*

Translate into Latin:

1. Are they deserving of praise who have done these things? (No.)
2. He says that he has not many slaves.
3. He has come to ask who commands the army.
4. It cannot be denied that we all lose much time.
5. There were some who promised to remain at Rome.
6. Give these two books to your friend and ask him to set out to-day for Rome.

GREEK.

(*N. B.—All the Greek words must be written with the accents.*)

I. GRAMMAR.

1. What letters are called *smooth mutes. labial mutes?*—Make the required euphonic change in συν-γενης, ἰδ-τε, τετριβ-ται.—Define the terms *perispomenon, metathesis, proclitic,* giving an example of each.

2. Form the gen. and dat. in all numbers of μοῦσα, ἀνώγεων, πόλις, μήτηρ.—Decline ταμίας, πολύς through the sing.; βοῦς, καλλίων through the plural.—Form the gen. and dat. sing. in all genders of τιμάων (giving both the contracted and the uncontracted forms), δούς, λελυκώς.—Compare σεμνός, ὀξύς, σώφρων, καλός, ὀλίγος.—Decline σύ, τίς through the sing. and dual; ὅστις, οὗτος through the plural.

3. Give synopses through all the moods of the aor. mid. and aor. pass. of λύω, and the aor. act. of λείπω; synopsis of the pres. pass. of φιλέω, with inflection of the imperf. pass.; synopses of the pres. act. of τίθημι, and the 2 aor. of ἵστημι, with inflection of the indic. of each.—Give the principal parts of στέλλω, γίγνομαι, φημι, ὁράω, λαμβάνω, φαίνο.

II. COMPOSITION.

1. He came that he might stop this.
   ἔρχομαι. παύω.
2. Would that it had not happened!
   γίγνομαι.
3. They said that they intended to write.
   μέλλω. γράφω.

TERM EXAMINATIONS—GENERAL COURSES.

I. HISTORY AND POLITICAL SCIENCE.

1. ANCIENT HISTORY—PROFESSOR RUSSEL.

1. Into what races are mankind divided ethnologically?
2. Into what families are the languages of Europe and Asia divided philologically?
3. To what race of mankind do the Chinese belong and to what family does their language belong?
4. About how far back do Chinese records extend?
5. What attention have the Chinese paid to the history of their nation?
6. When did Confucius live? What was the character of his teaching?
7. What nations successively conquered China, and at about what time? Of what nationality is the present ruling race?
8. To what race do the people of Hindoostan belong, and to what family does their language?
9. What attention did the East Indians pay to history? Describe their intellectual character and habits.
10. What have been the prevailing religions of the East Indians? State their doctrines.
11. By what nations has Hindoostan been successively conquered?
12. Of what race were the Babylonians?
13. How far back can we trace Babylonian history?
14. Of what nationality were the Assyrians?
15. What memorials of Babylonian and Assyrian history remain?
16. Describe Assyrian civilization.
17. By what nation were Babylon and Assyria conquered?
18. What was the extent of the Persian monarchy under Darius Hystaspis?
19. How far back does our knowledge of Egypt extend? To what races did the Egyptians belong?
20. What means have we of knowing Egyptian history and civilization? Describe their civilization.
21. By whom were Persia and Egypt finally conquered, and of whose empire did they become a part?
22. To what races did the Hellenes belong? Which were the two principal sub-races?
23. What was the general character of the Spartan government? What was the character of the Athenian government? Explain as to each.

2. ROMAN HISTORY—PROFESSOR RUSSEL.

I.

1. Who were the original Italians?
2. What other people belonged to the same family?
3. After the Italians came into Italy, into what nations were they divided?

II.

1. At what date does the authentic history of Rome begin?
2. What authority have we for facts said to have occurred before that period?

III.

1. What was a Roman gens? a curia? a century? a tribe?
2. Under what two great divisions were the free inhabitants of Rome classed?
3. What rights had they respectively?
4. What means of obtaining privileges did the unprivileged class several times use?

IV.

1. What principle in regard to the possession of land is conspicuous in Roman history?
2. How did the small proprietors of land lose it?
3. What was the effect on the prosperity of Rome, of the want of small landed proprietors?
4. What was the object of the agrarian law?
5. Who were the Gracchi, and what did they accomplish?

V.

1. What was the prevailing policy of Rome with respect to foreign nations?
2. By what wars did Rome extend her power?

VI.

1. What was the effect of foreign conquest on the prosperity of the Romans?
2. How did it affect their mode of life, their independence, their morality?

VII.

1. In the time of Marius who were Roman citizens?

VIII.

1. What were the original causes of the loss of Roman liberty?
2. Who first destroyed Roman liberty?
3. After him what form of government did Rome need?
4. Between what persons was the struggle for supreme power?

3. HISTORY OF THE ROMAN EMPIRE—PROFESSOR RUSSEL.

1. What were the powers of the Emperor Augustus and of his immediate successors? Whence were those powers derived?
2. After the time of the Antonines, what body virtually appointed the Emperor? What was the origin of that body, and how large was it?

3. What change did Constantine the Great make in the imperial residence and in the constitution of the empire?

4. By whom and when was the empire divided into two parts—the Eastern and the Western? Give the limits of the two parts. What was the effect of that division on the decline of the empire?

5. How and when did the Roman Empire of the West become extinct?

6. To what principal causes was the decline of the Roman empire due?

7. How were the Goths divided? Where did they come from? Where were they when they first appeared in Roman history? What Roman emperor was defeated by them and when? When and under whom did they finally conquer Italy? How long did they keep possession of it?

8. Who were the Franks and where did they live?

9. Who were the Alemanni? Where did they live?

10. Who were the Huns? Describe the effect of their emigrations on the empire?

11. Where did the Vandals come from? Who was their most distinguished leader? Where did they finally settle?

12. Where did the Lombards come from? When and under whom did they conquer Italy? State particularly how Italy was divided between them and the Exarchs.

13. Who was Pepin le Bref? In what way and when did he become king of France? What return did he make for the decision in his favor? What present power rests on this transaction?

14. Who was Mohammed? Give date of the Hegira. Give his character, his doctrines and his purpose.

15. What was the origin of the Ottoman empire? What was its extent in Asia? On what occasion did the Ottomans enter Europe?

4. MEDIÆVAL HISTORY—PROFESSOR RUSSEL.

I.

1. Describe the Celtic character and religion.
2. What was the result of the Roman conquest of Gaul?

II.

1. Whence did the invaders come who conquered the Gallo-Romans? Name the different nations and say where they settled.

III.

1. How many dynasties of French kings have there been?
2. Name them and the period of the duration of each.

IV.

1. How did the first dynasty come to an end?
2. Where was Neustria? Where was Austrasia?

V.

1. Who was the first Carlovingian king?
2. How and when did he become king? Describe the transaction, showing the advantages on both sides.

3. Describe the character of Charlemagne. What became of his kingdom and when?

VI.

1. Describe the territory and the authority of the earlier kings of the third dynasty.
2. By whom were they opposed? Describe the power of these opponents.
3. Which king of France first extended his authority over the whole country?

VII.

1. To what did the bishop of Rome owe his supremacy over the other bishops?
2. What was the foundation of the temporal power of the Popes?
3. What claim did the Popes make in relation to the government of foreign nations? State the foundation of this claim and on what ground it was resisted.
4. Describe the decisive struggle between the Popes and the temporal sovereigns and the result.

VIII.

1. Describe the feudal system.
2. Mention the various services which were due from the vassal to his lord.
3. Describe the mode of life of a feudal baron.
4. What were the good effects of the system?
5. How did the system operate on the lower classes?
6. How did feudalism come to an end?

IX.

1. What attempts were made under the Valois kings to secure popular liberty?
2. Why did they fail?
3. What was the tendency of the monarchy under those kings? Describe the progress of royal power.

5. MODERN HISTORY—PRESIDENT WHITE.

1. Give some account of Brunelleschi and his connection with the history of Florentine Art.
2. Sketch the cause of the decline of Art after Michael Angelo and Raphael.
3. Give a brief account of the Colloquies of Erasmus. Name some of them. State the resemblances between Erasmus and Voltaire.
4. Give the main features of the struggle between the Obscurantists and Humanists, with an account of the part taken by Pfefferkorn.
5. Give the dates of Charles V's accession to the thrones of Spain and Germany. What was his title as king of Spain?
6. Give a short account of the attempt, made by Charles V on

one side and Francis I on the other, to secure the alliance of Henry VIII.

7. What was the league of Schmalkalden? What was the Peace of Passau, and when?

8. State the effect of the war between Charles V and Joseph I on Protestantism in Germany.

9. Give the names of Loyola's principal associates in founding the Order of the Jesuits.

10. State the part taken by Sainez at the Council of Trent.

11. Give the date of the beginning of the Council of Trent. Where is Trent?

12. Describe the connection of Wallenstein with the Thirty Years War.

13. What is Cardinal Richelieu's relation to the history of religious toleration?

14. What struggle was going on in England at the time of the Fronde?

15. Name the two religious orders founded by St. Vincent de Paul.

16. Name the chief political opponents in Europe of Louis XIV. What were "Les Chambres de la Réunion"?

17. Give the main points in the connection of John Law with the French Government.

6. FRENCH HISTORY—PRESIDENT WHITE.

1. What is Mignet's remark regarding the transition from the classic literature of the time of Louis XIV to the philosophic literature of the time of Louis XV?

2. Give a general statement regarding Voltaire's life and influence.

3. Give some idea of the method of attacking old institutions in France taken by Montesquieu in the Persian Letters.

4. Give Rousseau's idea of representation in a republic as stated in the treatise on the Social Contract.

5. Name some of the principal Encyclopædists. Why were they so called? What relation do they bear in the history of French thought to Voltaire and Rousseau?

6. What was Jansenism?

7. Who was Maurepas? What were his ideas regarding the formation of the Ministry?

8. State the main agencies through which the American Revolution influenced the French.

9. Up to what period of the French Revolution was this influence exercised and why did it cease?

10. What was the great preliminary question regarding the States General to be decided before the meeting?

11. What as soon as it had met?

12. State Burke's objection to the way the States General was composed and give your own opinion.

7. ENGLISH HISTORY—PROFESSOR GOLDWIN SMITH.

1. Of what races is the British nation composed? In what districts does each race prevail?
2. What were the powers of the Saxon kings? Was the monarchy hereditary or elective?
3. What political struggle took place in the reign of Edward the Confessor?
4. Give the leading features of the policy of William the Conqueror in Church and State.
5. For what principle did Anselm contend against Henry I? What was the issue of the contest?
6. Of what tendency of the feudal system is the reign of Stephen an example?
7. What was the question at issue between Henry II and Thomas à Becket? What was the immediate, and what the ultimate result of the struggle?
8. State the good and bad features of the character of Richard I, connecting them with the state of morality and civilization in his time.
9. What was the most important article of the Great Charter?
10. What new religious orders appeared in England in the time of Henry III? What led to their foundation?
11. Give an account of the statute of Mortmain.
12. What economical crisis marked the reign of Edward III? To what legislation did it lead?
13. What led to the insurrection of Wat Tyler?
14. What were the political consequences of the Wars of the Roses?
15. Why is the reign of Henry VII said to mark the commencement of Modern History?
16. How far was the Reformation carried in the reign of Henry VIII?
17. What was the policy of the Protector Somerset?
18. Account for the religious reaction at the accession of Mary.
19. What led to the development of the English drama in the age of Elizabeth?

7. POLITICAL ECONOMY—PROFESSOR WILSON.

[*Specimens of sets of questions, twenty in all, drawn by lot by each student.*]

NO. 4.

4. What is utility or intrinsic value? What objects have such value? Has the same article different intrinsic values? How is this?

24. Who are *traders?* What is their relation to each of the two factors of wealth, quantity and value?

44. What has been the law or ratio of increase as between population and distributive wealth *up to this time?* Is there any reason to suppose that that ratio will ever be different?

64. What is simple barter? Show the advantages of a circulating medium as a labor-saving machine.

84. Explain the use of money as a *machine* for exchange. Why are gold and silver preferable to other metals?

NO. 12.

12. What is *price* and how does it differ from value? Show the error of Mill's doctrine [B. I. Chap. I. § 3.] that price results only from limitation of supply. Explain $P = V + (d - s)$.

32. In what sense is land a "force of nature," to what extent a "machine"? Regarded as a machine, what are the "forces" that it utilizes?

52. Show that the rate of wages will increase with the intelligence of the laborers. Does this apply to the educated few only or to the masses as well?

72. State and explain the principal ways in which the cost of transportation and exchange can be diminished.

92. State the difference, in case of loss by the sinking of a ship and such like calamities, between the loss of a sum in coin and that of the same sum in bills (1) to the parties themselves and (2) to the community.

8. PHILOSOPHY OF HISTORY—PROFESSOR WILSON.

[*Specimens of the sets of questions furnished to each student by lot.*]

NO. 2.

2. What are the three agents that control the causes and results of history? What are the different theories of their relative influence?

22. Why may we not expect any high civilization in extreme latitudes? What is the effect of elevation above sea level on civilization?

42. What influence has intellectual culture on religion with reference to (1) fetichism, (2) polytheism and (3) monotheism?

62. Describe the circumstances of race and physical position that made Athens the place of origin of modern civilization.

NO. 8.

8. Compare the value of the geological and the philological indications as to man's early conditions.

28. What size, in a city, is regarded as most favorable to civilization? What are the *physical* effects of increase beyond this limit?

48. How were the Chinese written characters formed? How do they differ from the polysyllabic words of Indo-European languages?

68. What circumstances, historically, gave the Christian religion an advantage over the heathen religions of the time?

9. AMERICAN LAW AND POLITY—PROFESSOR WILSON.

[*Forty lectures in all.—Sub-divisions of the Course.*]

I. The Constitution of the United States. Lects. I—XII.
II. International Law. Lects. XIII—XVII.
III. Municipal Law. Lects. XVIII—XX.
IV. Laws Relating to Property. Lects. XXI—XXXII.
V. Criminal Law. Lects. XXXIII—XXXVI.
VI. Legal Maxims. Lects. XXXVII—XL.

[*Specimens of subjects, forty in all, drawn by lot one for each student.*]

II.—The Continental Congress and Articles of Confederation.
IX.—Restraints upon Congressional Legislation. Art. I. Sec. 9.
XIV.—The relation of Nations in times of Peace.
XVII.—Rights and Liabilities in time of War.
XVIII.—Origin and Development of National Codes.
XXI.—Nature and Kinds of Property. Eminent Domain.
XXV.—Real Estates by Contracts among the living.
XXVII.—Contracts for Personal Property.
XXXI.—Agency and Partnership.
XXXIII.—What constitutes a Crime. Crimes against Governments.
XXXVIII.—Maxims relating to the Judiciary.
XL.—Maxims fundamental to all Law.

II. ANCIENT LANGUAGES.

I. LATIN—PROFESSOR PECK.

I. HORACE—ODES, I, 2, 30–52.

1. Translate:—

Tandem venias precamur
Nube candentes humeros amictus,
Augur Apollo;
Sive tu mavis, Erycina ridens,
Quam Jocus circum volat et Cupido;
Sive neglectum genus et nepotes
Respicis, auctor,
Heu nimis longo satiate ludo,
Quem juvat clamor galeaeque leves
Acer et Mauri peditis cruentum
Vultus in hostem;

Sive mutata juvenem figura
Ales in terris imitaris, almae
Filius Maiae, patiens vocari
Caesaris ultor:
Serus in caelum redeas diuque
Laetus intersis populo Quirini;
Neve te nostris vitiis iniquum
Ocior aura
Tollat: hic magnos potius triumphos,
Hic ames dici pater atque princeps,
Neu sinas Medos equitare inultos,
Te duce, Caesar.

2. Who are meant by *Erycina ridens, auctor, filius Maiae,* and why are they introduced here? State the occasion and the thought of the Ode.

3. Construe *populo, vitiis, dici.* Compare *acer, juvenem, diu, ocior.* Give the derivation of *mutata, ales, almae, pater.* Form diminutives to *vultus, populo, filius,* and to the comparative of *magnos.*

4. Draw a map of Italy, and locate upon it *Anio, Antium, Roma, Tarentum, Tibur, Venusia.*

5. Translate, and make full metrical schemes of the lines
(1) Dignum laude virum Musa vetat mori.
(2) Ille mi par esse deo videtur.
(3) Doctrina sed vim promovet insitam.
(4) Neque hic lupis mos nec fuit leonibus.

II. DIALOGUS DE ORATORIBUS, IX.

1. Translate:—

Nam carmina et versus, quibus totam vitam Maternus insumere optat (inde enim omnis fluxit oratio), neque dignitatem ullam auctoribus suis conciliant neque utilitates alunt; voluptatem autem brevem, laudem inanem et infructuosam consequuntur. licet haec ipsa et quae deinceps dicturus sum aures tuae, Materne, respuant, cui bono est, si apud te Agamemnon aut Iason diserte loquitur? quis ideo domum defensus et tibi obligatus redit? quis Saleium nostrum, egregium poetam vel, si hoc honorificentius est, praeclarissimum vatem, deducit aut salutat aut prosequitur? nempe si amicus eius, si propinquus, si denique ipse in aliquod negotium inciderit, ad hunc Secundum recurret aut ad te, Materne, non quia poeta es, neque ut pro eo versus facias; hi enim Basso domi nascuntur, pulchri quidem et iucundi, quorum tamen hic exitus est, ut cum toto anno, per omnes dies, magna noctium parte unum librum excudit et elucubravit, rogare ultro et ambire cogatur, ut sint qui dignentur audire, et ne id quidem gratis; nam et domum mutuatur et auditorium exstruit et subsellia conducit et libellos dispergit. et ut beatissimus recitationem eius eventus prosequatur, omnis illa laus intra unum aut alterum diem, velut in herba vel flore

praecepta, ad nullam certam et solidam pervenit frugem, nec aut amicitiam inde refert aut clientelam aut mansurum in animo cuiusquam beneficium, sed clamorem vagum et voces inanes et gaudium volucre.

2. Origin, exact meaning, and syntax of *cui bono*. Customs alluded to in *deducit, salutat, prosequitur*. Etymology and precise force of *ultro*. Construction of *id, gratis*.

3. History, circumstances and influence of the *recitationes*.

4. Outline of the Dialogus. Prominent peculiarities of its style, and discussion of question as to its authorship.

5. Characteristics and explanation of the prevailing literary style of the age.

III. PLINY—EP. II, I.

1. Translate:—

Post aliquot annos insigne atque etiam memorabile populi Romani oculis spectaculum exhibuit publicum funus Vergini Rufi, maximi et clarissimi civis, perinde felicis. Triginta annis gloriae suae supervixit. Legit scripta de se carmina, legit historias et posteritati suae interfuit. Perfunctus est tertio consulatu, ut summum fastigium privati hominis impleret, cum principis noluisset. Caesares quibus suspectus atque etiam invisus virtutibus fuerat evasit, reliquit incolumem optimum atque amicissimum, tamquam ad hunc ipsum honorem publici funeris reservatus. Annum tertium et octogesimum excessit in altissima tranquillitate, pari veneratione. Usus est firma valetudine, nisi quod solebant ei manus tremere, citra dolorem tamen. Aditus tantum mortis durior longiorque, sed hic ipse laudabilis. Nam cum vocem praepararet acturus in consulatu principi gratias, liber quem forte acceperat grandiorem et seni et stanti ipso pondere elapsus est. Hunc dum sequitur colligitque, per leve et lubricum pavimentum fallente vestigio cecidit coxamque fregit, quae parum apte collocata reluctante aetate male coiit. Huius viri exequiae magnum ornamentum principi, magnum saeculo, magnum etiam foro et rostris attulerunt. Laudatus est a consule Cornelio Tacito: nam hic supremus felicitati eius cumulus accessit, laudator eloquentissimus.

2. Derivation of *dum*, and its successive meanings and constructions. Changed meaning of *privatus* under the empire. To whom do *Caesares* and *optimum* refer?

3. History of the word *Caesar* as a title. Prominent features of a *funus publicum*, and of a *laudatio funebris*. Misuse sometimes made of the latter.

4. Careers of Verginius Rufus and of Cornelius Tacitus, and their relations to Pliny.

5. Character of the Latinity and the literature of the Silver Age. Cicero's and Pliny's letters in regard to their style and historical value.

IV. LUCRETIUS—II, 1157–1174.

1. Translate :—

Praeterea nitidas fruges vinetaque laeta
sponte sua primum mortalibus ipsa creavit,
ipsa dedit dulcis fetus et pabula laeta;
quae nunc vix nostro grandescunt aucta labore,
conterimusque boves et viris agricolarum,
conficimus ferrum vix arvis suppeditati:
usque adeo parcunt fetus augentque labore.
iamque caput quassans grandis suspirat arator
crebrius, incassum manuum cecidisse labores,
et cum tempora temporibus praesentia confert
praeteritis, laudat fortunas saepe parentis
et crepat, anticum genus ut pietate repletum
perfacile angustis tolerarit finibus aevom,
cum minor esset agri multo modus ante viritim.
tristis item vetulae vitis sator atque vietae
temporis incusat momen caelumque fatigat
nec tenet omnia paulatim tabescere et ire
ad capulum spatio aetatis defessa vetusto.

2. Derivation and analogues in cognate languages of *fruges, fetus, pabula, caput, manus, genus, pietas, modus, caelum, capulus.* Unusual forms and constructions. Connection of this passage with the philosophy of Lucretius.

3. Biography of Lucretius; his personal character as gathered from his poem; his relations to his predecessors and to his successors; peculiarities of his versification; characteristics of his Latinity; an outline of his cosmical, theological, and ethical notions.

2. GREEK—PROFESSOR FLAGG.

I. PERSIANS OF AESCHYLUS.

I. *vv.* 1–139. Designate the principal divisions of this passage, and state by whom and in what manner each was probably performed. Give the technical name of the part comprising *vv.* 93–100. What difference in tone is observable between what immediately precedes and what follows this part?—Comment on οἶτε (16): στεῦται (49): ἄκμονες (51): περσέπτολις (65): ἔσσεται (syntax) 121.—Explain the metrical peculiarity of *v.* 32 (*cf.* 152).—*Translate vv.* 12–20 and 101–113.

II. *Translate vv.* 447–464. Explain the mood and tense of ἐκσωζοίατο (451) and τράποιντο (459). Scan *vv.* 447–448.—*Translate vv.* 739–752, and scan *v.* 741.

III. *vv.* 800–828. Explain the negative particles in *v.* 802. How does Darius say that he arrives at a knowledge of what he narrates in the following lines?—Explain the mood and tense of ἐκχέῃ (826).—Give the date of the historical event referred to in this passage. Show the significance of Δωρίδος (817.)

Mention any instances of tragedies with historical subject earlier than the *Persians*. By what means is the present play rendered Panhellenic (not exclusively Athenian) in spirit? How has Aeschylus contrived to give it the usual religious character? In what did the ὕβρις of Xerxes consist?

II. AGAMEMNON OF AESCHYLUS.

I. *Translate* (*a*) *vv.* 97–103: (*b*) 145–155: (*c*) 164–178: (*d*) 252–257.—Designate the main divisions of the Parodos, give a synopsis of the contents of each and show their bearing on one another. What state of mind on the part of the Chorus is exhibited by the Parodos as a whole?—Explain the mythological allusions in passage (*c*). Describe the ethical doctrine on which the dynasty of Zeus, as conceived by Aeschylus, is founded. What are the functions of the Aeschylean Μοῖρα?

II. *Translate* (*a*) 379 (ἔστω)–386: (*b*) 456–465 (ἀμαυρόν): (*c*) 700–708: (*d*) 750–762: (*e*) 987–994.—Point out the transitions of thought in the first Stasimon, and show how they accord with the feelings of the Chorus. How is the second Stasimon connected with the first, and each Stasimon with the Epeisodion preceding it? Wherein does the third Stasimon exhibit a different mode of reflection from the other two?—State fully the divergence from the popular belief announced in passage (*d*), with (*a*) and (*b*), etc. How far is the notion of a family curse reconcilable with Aeschylus' system of ethics? Give the Greek words which may be regarded as technical terms in the expression of the doctrine.

III. *Translate* (*a*) 925–934; (*b*) 1177–1190: (*c*) 1523–1536.—Give the leading traits in the character of Agamemnon as drawn by Aeschylus.—What artistic purposes are served by the scene between Cassandra and the Chorus? Remark on its relation to the unity of the tragedy.—Give the substance of Clytaemnestra's defense, and that of the Chorus' reply. Explain *vv.* 1535–6. What are the subjects of the second and third plays of the trilogy? State the grounds of the final reconciliation.

IV. From what verbs and where formed are ἐπίανεν (276): ὑπερθόρας (786): πραθέντα (1041): ἐφεύξας (1308): ἔλακες (1426): ἀλύξειν (1615)?

III. PLATO'S LACHES.

I. 181 A, B. What does ὅτι (before ὀρθοῖς) connect?—ὅτι before οἰκεῖα?—Where is ἀφίεσο formed?—Explain the case of ὅν (σὺ νῦν ἐπαινεῖ): the meaning of καὶ (σὺ δέ).—*Translate from* Εὖ γε *as far as* σοι εἶναι—Characterize Lysimachus from this passage and 180 D, E, etc.

II. *Translate* 192 E, 193 A.—Where is ἐκτήσεται formed?—Explain αὕτη (193).—Where is the proposition antithetic to (εἰδότα)

μὲν?—What is the fault in Laches' second definition of courage? What was the fault in his former one?

III. 196 C, D. Explain the construction of οἴεται: the force of αὐτὴν (ταύτην τὴν ἐπιστήμην). *Translate as far as* οὕτως ἔλεγες.—Wherein is the definition of Nicias proved to be faulty? To what important Socratic doctrine does the refutation of it lead?

How may the assumed time of this dialogue be approximately determined? Show the appropriateness of the selection of Nicias and Laches as interlocutors, with reference to their personal traits. How is Socrates represented in comparison with the two generals (see especially 188 C, etc.)?

IV. DEMOSTHENES (I. II. III. IV. VIII).

I. Ol. *I*, § 28.—*Translate the section.*—What faults in Athenian disposition and policy are summed up in this tripartite division of ἅπαντας?—Explain εὔθυναι as here used.—What may be said of the perorations of the Demosthenic speeches in general?

II. Ol. *III*, §§ 8–9.—Expand τῆς περιστάσης ἂν ἡμᾶς αἰσχύνης into a clause.—Explain the construction of ποιήσειν (§ 9).—What were the relations of the Athenians with the Thebans and the Phocians at this time?—*Translate* § 9.

Why may the events of the Olynthian war be said to form a period in the public career of Demosthenes?

III. *Chers.* §§ 5 and 6.—*Translate and analyze this period.*—Give a brief account (with date) of the negotiation of the Peace here spoken of.—Specify some points of which the treatment in this oration (§§ 13, 18, 35, 49, 51, 59, 61, 66, 76, 77,) is noticeably different from that adopted in the early speeches, and explain the difference of tone.

V. (A.) PINDAR.

Translate (*a*) Oylmp. I, 17 (ἀλλά)–29: (*b*) Nem. II, 13–18: (*c*) Isthm. I, 28–40.—Note, in (*a*), the transition to the mythical part and the words that have been previously introduced to prepare for the subject of it. What is there in the handling of this mythus that is characteristic of Pindar?—Show, in (*c*), the significance of coupling the two heroes named in the mythus, giving the obvious (17), and the (as is conjectured) remoter reason.

(B.) THEOCRITUS.

Translate (*a*) I, 39–44: (*b*) XI, 38–43: (*c*) XV, 132–138.—Explain (etymologically, by comparison with the Attic) the following dialectic forms:—ᾠδήκαντι (I, 43): τράφω, νεβρῶς (XI, 40): ἔχοισα (XV, 131): οἰσεῦμες (133).—What are the merits that chiefly distinguish Theocritus among the writers of the Alexandrine period?

III. MODERN LANGUAGES.

I. FRENCH—PROFESSORS RŒHRIG AND STEBBINS.

Translate the following into French:

1. The bookseller has good books, and the carpenter has bad ones. Here are two. Which do you desire?
2. I am not satisfied with those which I have read; can you not lend me a better one?
3. There are ten trees in my garden, and fourteen in my brother's, how many have you in yours?
4. I have only two, and I gave them to him, and I cannot sell you any.
5. Wine is good for the sick; milk is better for you and me, and water is excellent when one is thirsty.
6. Has the girl any more silk? I need some in order to mend my silk stockings.
7. She bought some this week, but used some in order to mend my hat, and now she has no more.
8. Who asked for my mother to-day? The painter, whom you know, asked if she was at home; I do not know what his name is.
9. It is not suitable for us to go out when it rains, nor to remain at home when it is fine weather.
10. In order to learn French you must study and write many exercises.
11. At what hour did your brother go to bed this evening? We could not speak to him, for he went away too early.
12. Are you General Smith's oldest daughter? No, sir, I am not.
13. Has anything happened to them? We did not see them at church this morning.
14. Why do you not make haste? It is a quarter before nine, and you are to take your little brother to school.
15. I have eaten nothing the whole day, but I am neither hungry nor thirsty.
16. Colonel G. has money and he buys beautiful paper and French engravings. It does not become him to reproach me with my conduct.
17. Those apple trees are mine, these are my wife's. Whose are the flowers which you are carrying from market?
18. They belong to my shoemaker. He has just bought them this afternoon and now is going to put them in his child's garden.
19. If you have heard of your son, it is important that you write to him and tell him not to marry that girl; he ought not to go near her.
20. I doubt that he goes to England. I do not believe that he has any friends there, and I do not think that one can be without friends in a foreign country.
21. As soon as he had said this, he rose and spoke to them, and

said, "Do not injure him, bring him to me, and remember what he did to you when you had few friends and needed brave ones."

22. Whatever I may do, I cannot help laughing when that boy comes near me; the sleeves of his coat are six inches too short, and he wears a white cloth hat and he carries a cotton umbrella.

23. Take care not to lose your purse. I am afraid you have left it in your room, and you must pay your tailor to-morrow seventeen dollars for your half-dozen shirts.

II. SECOND YEAR—SECOND TERM.—PROFESSOR CRANE.

I. CORNEILLE'S CID.

1. *Translate:*

Les Maures vont descendre; et le flux et la nuit
Dans une heure à nos murs les amènent sans bruit.
La cour est en désordre, et le peuple en alarmes;
On n'entend que des cris, on ne voit que des larmes.
Dans ce malheur public mon bonheur a permis
Que j'ai trouvé chez moi cinq cents de mes amis,
Qui, sachant mon affront, poussés d'un même zèle,
Se venaient tous offrir à venger ma querelle.
Tu les as prévenus; mais leurs vaillantes mains
Se tremperont bien mieux au sang des Africains.
Va marcher à leur tête, où l' honneur te demande:
C'est toi que veut pour chef leur généreuse bande.
De ces vieux ennemis va soutenir l'abord,
Là, si tu veux mourir, trouve une belle mort;
Prends-en l' occasion, puisqu' elle t' est offerte;
Fais devoir à ton roi son salut à ta perte:
Mais reviens-en plutôt les palmes sur le front.

2. Give principal parts of all irregular verbs in the above passage.

3. Parse *Tu les as prévenus*, (line 9), and give rule for agreement of past participle in compound tenses.

4. Parse *c'est toi que*, (line 12). Parse *Fais devoir à ton roi son salut*, (line 16), and illustrate this construction by an original example. Give etymology of *bonheur*, (line 5).

5. Divide the first three lines into feet, and indicate the cæsura. What are the various names applied to this metre, and why?

6. State what you know about the sources of this play.

II. LA MAISON DE PENARVAN, PAR JULES SANDEAU.

a. 1. *Translate:*

PAUL (*se levant aussi*). Ah! ma cousine, si vous le prenez ainsi, nous ne pourrons jamais nous entendre. Il y a entre nous une révolution, un monde écroulé, un abîme . . . et nous ne parlons pas la même langue.

RENEE. C'est tant pis pour vous, monsieur de Penarvan!

PAUL. Et que m'importent les destinées de la maison de Penarvan ? Est-ce que je la connais ? Qu' a-t-elle fait pour moi ? Votre père, anticipant sur la mort, avait jugé plaisant de rayer le mien du nombre des vivants ; vous, ma cousine, vous ne saviez pas même que je fusse de ce monde, et il a fallu qu'un hasard se chargeât de vous l'apprendre . . . . Vous êtes accourue ; pourquoi ? pour rapprocher les débris de notre famille ? pour m'apporter l'oubli du passé ? Allons donc ! Vous n'êtes venue que pour préserver cet illustre nom de la souillure d'une mésalliance . . . une mésalliance pour vous, mais non pour moi, qui me fais gloire d'être de mon temps et ne suis d'ailleurs ni duc ni marquis.

2. Parse *pis* (line 5), *que* (line 6), *est-ce que* and *qu'* (line 7), *qui me fais* (line 15).

3. Explain mood of *fusse* (line 10), and *chargeât* (line 11).

b. 1. Explain the accent in : *à, là, dû, tû, mâle, château, état, finît.*

2. Write the first person singular, present indicative of *se promener, posséder, appeler, jeter,* and the feminine of *premier* and *complet.*

3. Translate line 1021 of the Cid : *Justes cieux ! me trompé-je encore à l'apparence. Ou si je vois enfin mon unique espérance ?* Explain *trompé-je.*

c. Translate into French the following sentences :

1. When I shall have caused myself to be killed, perhaps she will regret me.

2. I have seen them (masc.) strike.

3. I have seen them (fem.) struck.

4. I have heard her sing a French song.

III. SECOND YEAR—THIRD TERM.—PROFESSOR CRANE.

I.

1. *To be translated at sight :*

MONTAIGNE.

On sait avec quelle constance il avait étudié les grands génies de l'ancienne Rome, combien il avait vécu dans leur commerce et dans leur intimité. Doit-on s'etonner que son ouvrage porte, pour ainsi dire, leur marque, et paraisse, du moins pour le style, écrit sous leur dictée ? Souvent il change, modifie, corrige leurs idées. Son esprit, impatient du joug, avait besoin de penser par lui-même : mais il conserve les richesses de leur langage et les formes de leur diction. L'heureux instinct qui le guidait lui faisait sentir que, pour donner à ses écrits le caractère de durée qui manquait à sa langue, trop imparfaite pour être déjà fixée, il fallait y transporter,

y naturaliser en quelque sorte les beautés d'une autre langue, qui, par sa perfection, fût assurée d'être immortelle ; ou plutôt, l'habitude d'étudier les chefs-d'œuvre de la langue latine le conduisait à les imiter. Il en prenait à son insu toutes les formes, et se faisait Romain sans le vouloir. Quelquefois, réglant sa marche irrégulière, il semble imiter Cicéron même. Sa phrase se développe lentement, et se remplit de mots chosis qui se fortifient et se soutiennent l'un l'autre dans un enchaînement harmonieux.—*Villemain*, 1790–1867.

2. Give principal parts of ***sait, vécu, doit, paraisse, écrit, sentir, fallait, conduisait, remplit.***
3. Parse ***paraisse, fût assurée.***
4. Parse ***quelle, lui faisait sentir que.***
5. Derivation of ***durée, insu.***

II.

1. *To be translated at sight:*

A QUOI DOIVENT TENDRE LES EFFORTS DU SAGE.

C'est l'erreur que je fuis : c'est la vertu que j'aime.
Je songe à me connaître, et me cherche en moi-même.
Sur cette vaste mer qu'ici-bas nous courons,
Je songe à me pourvoir d'*esquif et d'avirons,
A régler mes désirs, à prévenir l'orage,
Et sauver, s'il se peut, ma raison du naufrage.
C'est au repos d'esprit que nous aspirons tous ;
Mais ce repos heureux se doit chercher en nous.
Un fou rempli d'erreurs, que le trouble accompagne,
Est malade à la ville ainsi qu'à la campagne.
De nos propres malheurs auteurs infortunés,
Nous sommes loin de nous à toute heure entraînés.
A quoi bon ravir l'or au sein du nouveau monde?
Le bonheur tant cherché sur la terre et sur l'onde
Est ici, comme aux lieux où mûrit le coco,
Et se trouve à Paris de même qu'à Cuzco:
On ne le tire point des veines du Potose.
Qui vit content de rien possède toute chose:
Mais, sans cesse ignorants de nos propres besoins,
Nous demandons au ciel ce qu'il nous faut le moins.

—*Boileau*, 1636–1711.

2. What is the metre of this poem?
3. Explain the use of the article with ***erreur, vertu*** (line 1), ***or*** (line 13), ***bonheur*** (line 14).
4. Derivation of ***prévenir*** (line 5), ***naufrage*** (line 6), ***mûrit*** (line 15).

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* Skiff and oars.

2. GERMAN.

I. FIRST YEAR—THIRD TERM.—PROFESSORS HEWITT AND MACKOON.

I.

1. How has *zu* in German, *to* in English, come to be used with the infinitive form of the verb?

2. What relations in a sentence may this form of the infinitive sustain?

3. When is the infinitive without *zu* used?

4. What is the office of the participle in the tenses called compound, and throughout the passive voice?

5. How does the subjunctive differ from the indicative in meaning and in form? Three of its main uses.

6. How have prepositions been chiefly derived?

7. How were expressed, in the earlier forms of German and English, the relations which are now indicated by prepositions?

8. How are conjunctions classified? Mention all the general connectives.

9. What means are employed in the derivation of verbs, nouns and adjectives? What is the primitive form of these parts of speech?

10. Expand the three letters *t*, *k*, *p*, into the nine Indo-European mutes; state the law of their progression, and show by a table how according to this law they would be represented in German and English. Show by a separate table the actual correspondence between English and German.

Translate into English, (Whitney's "Reader," p. 158) from "So findet die Erwartung sich jeden Tag genährt," to "Sondern in einem Saale unter Bekannten zu sein."

II.

1. What is the syntactical relation of *Tag* (1), *Strasse* (12), *Galerie* (13)?

2. Point out in the first two periods five different classes of pronouns.

3. Why is *auf* separated from *packen* (7), and why does it adhere to *hört* (12)?

4. Where is *sei erlaubt* (3) made? why subjunctive? Why is *sei* not transposed? Explain *werden behängt* (8, 9) and *behängt sind* (14).

5. Why do *tritt* and *glaubt* (19) stand at the end and beginning of their respective clauses?

6. What kind of subordinate clauses are introduced by *bis* (2), *die* (11), *dass* (17)? Show their relation to the words on which they depend.

7. Why does *selten* (17) not immediately precede its verb, *erinnert*, as well as *nun* (11) its verb, *aufhört?* Why is *sondern* (19) used, rather than *aber?*

8. Explain the use and meaning of the suffixes: *ung* in *Erwartung* (1); *lich* in *endlich* (2), *icht* in *thöricht* (3), *haft* in *ernsthafte* (4), *er* in *Römer* (4), *gekläppert* (7), *wohnbarer* (18), *fällig* in *sorgfältig* (5), *ig-keit* in *Bedächtigkeit* (6), *bar* in *wohnbarer* (18).

9. Give the derivation of *legt* (4), *hütet* (5), *nach* (9), *erinnert* (17), *immer* (18), *nicht* (19).

10. What are the English cognates of *Glocke* (2), *Zeichen* (3), *erlaubt* (3), *Augenblick* (4), *gleicht* (12), *Zimmer* (16), *Dach* (17), *tritt* (19), *glaubt* (19), *sondern* (19).

III.

Translate into German:

When two French grenadiers, who had been prisoners in Russia, heard that France had lost, and that the emperor was a prisoner, they wept together over this sad news. Then said [the] one *of them*, who was wounded: "My old wound burns again and pains me sorely; I shall not live much longer." "Thou canst die," replied the other, "for thou hast neither wife nor child at home, who would have to go begging, but for thee." "Wife or child concerns me not," said the first again, "when my emperor is taken. If thou comest to France, grant me this last request: have me buried in French earth, with my musket in my hand, and the cross of honor on my breast, that I may lie there and listen till the emperor shall ride over my grave; then I will come forth armed, to protect him."

IV.

[*The Honor Section may perform the following in addition to the foregoing*].

Translate into English, (Whitney's "Reader," p. 26) from "Der Ritter fuhr in seiner Erzählung fort," to "meines Rosses Lauf ungestüm kreuzend und hemmend."

1. Derivation of *Ritter* (1), *Erzählung* (1), *Erhitzung* (3), *kein* (8.)

2. Etymology of *Pferde* (2), *Angst* (3), *grund* in *Abgrund* (5), *kreuzend* (11), *erst* (8).

3. English cognates of the root in *Erzählung* (1), *scheuen* (2), *triefte* (3), *Angst* (3), *werfe* (5).

4. Parse *wäre angerannt* (1, 2, 3), *werfe* (5), and give the reason for the subjunctives.

5. Define the terms "inversion" and "transposition," and give the rules for the employment of each.

II. SCHILLER'S WILHELM TELL.—PROFESSOR FISKE.

[*Examination for two Terms.*]

I.

1. *Translate*, (Act I, sc. 2) from "Er ist dir neidisch, weil du glücklich wohnst," to "Der kluge Mann baut vor."

2. Give *a.* the plurals of *Mann; b.* the various meanings of *Erb; c.* the difference in the construction of the clauses introduced by *weil* (line 1) and *denn* (line 3); *d.* the reason for the form *keins* and the etymology of the word; *e.* the etymology of *Kaiser* and the importance of it in philology; *f.* the various meanings of the stem *Reich* (or *reich*) and the cognates in English; *g.* the cognates of *trägst; h.* the omission in line 5 and the rule for it; *i.* the plurals of *Land* and their various significations; *j.* the inflection of *Herrn; k.* the various changes of the stem in *höchsten; l.* the reason for *-heit* in *Christenheit; m.* the composition of *jüngrer; n.* the derivation and grammatical character, as here used, of *sein* (fourth word in line 9); *o.* the etymology of *Glück*, of *giftger*, of *Missgunst; p.* the abstract noun derived from the stem of *längst* and the rule for such derivation; *q.* the English cognates of *geschworen; r.* the English vocables cognate with *baut; s.* the principal parts of *darfst* (4), *zeigen* (4), *erkennst* (6), *sieht an* (10–11), *geschworen* (12), *erwarten* (13).

3. Who is meant by "*den höchsten in der Christenheit,*" and why was he so styled?

II.

1. *Translate,* (Act II, sc. 1) from "Ja, ich verberg es nicht," to "Auf deinem eignen Erb und freien Boden."

2. Give *a.* the English cognate of *berg* in *verbergen* and other words in which *g* is similarly represented in English; *b.* the derivation of *Fremdlinge; c.* the cognate of *schelten; d.* the reason why the Eng. pers. pron. *I* consists of a long or dipthongal vowel while *i* in *ich* is short; *e.* the cognate of *edle; f.* the derivation of *Jugend* and the concrete noun in German corresponding to it; *g.* the origin of *-s* in *rings; h.* the etymology of *Ehre; i.* other words derived from the same stem as *sammeln; j.* the etymology of the noun *Habsburg* and the historical importance of the place; *k.* the difference in signification between Germ. *still* and Eng. *still; l.* the derivation of *geschehen; m.* the etymology of *Welt; n.* the use of *Ge-* in such words as *Getön* (12) and *Geläut* (16); *o.* the significations and plurals of *der Heerd* and *die Heerde; p.* the force of *ver* in *verführt* (17) and *verachte* (18); *q.* the reason for the form *Geburts* in *Geburtsland; r.* the rule by which "*schäme dich!*" is translated "be ashamed!"; *s.* the rule for the omission of the inflectional ending in *uralt; t.* the cognates of *kaufe* in *verkaufe; u.* the 2d pl. imper. of *nimm* and its Eng. cognates; *v.* the cognate of *werd*, of *Knecht* in *Fürstenknecht; w.* the principal parts of *schelten* (3), *liegen* (6) and its causal, *verlieren* (8), *geschehen* (9), *ladet* (13—old and new), *dringt* (14) and its causal, and *verführt* (17).

3. Who are meant by the *Fremdlinge* (2)?

III.

1. *Translate,* (Act. III, sc. 3) from "Lasst es genug sein, Herr!" to "Dem's Herz nicht in die Hand tritt noch ins Auge."

2. Give *a.* the composition of *unmenschlich* and the etymology of its stem; *b.* the grammatical term used in explaining the difference in form between *durch* and its Eng. cognate; *c.* the derivation of *Schuld; d.* the government of *kennen; e.* the use here of the form *lernen; f.* the government of *Stunde; g.* the prepositions and cases by which *denken* may be followed; *h.* the derivation of *öffnet; i.* the etymology and cognate of *Gasse; j.* the cognates of *Frisch; k.* the etymology of *gnädig; l.* the etymology of *Geschick* and any other noun of the same stem; *m.* the difference between *der* (13) and *den* (14); *n.* the derivation of *Spruch* and the reason why its radical vowel is *u*; *o.* the etymology of *sicher* and its cognates; *p.* the government of *Blicks* and its cognate; *q.* the principal parts of *gilt* and its cognate; *r.* the etymology of *Kunst; s.* the cognate of *auch*; *t.* the difference in form between *andrer* and its cognate; *u.* the grammatical character of *mir* in line 19.

IV.

Give *a.* the different reasons for the inversion of sentences; *b.* the etymology of the words *Freund* and *Feind; c.* the rule for the formation of the pret. subj. of strong verbs; *d.* the rule for the employment of the superlative adj. as predicate and adverb; *e.* some of the nouns derived from the verb *binden* with their genders and plurals.

V.

1. Give *a.* the dates and places of Schiller's birth and death; *b.* the time of his birth as compared with that of Goethe and of Lessing; *c.* the date of the composition of "Wilhelm Tell"; *d.* the names of Schiller's principal other dramas and the country in which the scene of each is laid.

2. Draw a rough map of the scene of "Wilhelm Tell," indicating the position of the lake, the cantons and places mentioned in the drama.

III. GERMAN LITERATURE.—PROFESSOR BOYESEN.

FIRST AND SECOND TERMS.

I.

1. Name the still existing monuments of the Gothic language.

2. State what is known concerning the Gothic translation of the Bible.

3. Name the most important works written in the Old High German language (*Althochdeutsch*).

4. Give the names of the principal actors in the Nibelungen Lied and a brief outline of the plot.

5. Give a brief æsthetic analysis of the Nibelungen Lied, and point out its characteristic excellencies and deficiencies as compared with the Epic of the Greeks.

6. Sketch rapidly the story of Gudrun.
7. Give the titles of the old German poems which deal with the Arthurian legends and the Holy Grail.

II.

1. Give the names of six of the most prominent Minnesingers who are known as authors of still existing Epics.
2. Describe the Minnesinger period in its historic and literary aspects as compared with the Meistersänger period.
3. State what you know about Walter von der Vogelweide, and give a list of the writings commonly attributed to him.
4. Give a brief account of the life of Ulrich von Liechtenstein.
5. Describe the metrical structure of the Minnesong as compared with the Minne-lay.
6. Define the literary tendencies of the fourteenth and fifteenth centuries.
7. State what you know about Hans Sachs.
8. Name the German satirists of the sixteenth century and give a list of their most important works.

IV. GERMAN LITERATURE.—THIRD TERM.

III.

[*Each student is required to answer any ten consecutive questions.*]

1. Describe briefly the literary character of the seventeenth century as represented by Opitz and his school.
2. State what you know about the institutions in Germany, corresponding to the Italian Academies of the fifteenth and sixteenth centuries. Trace their influence upon literature.
5. Mention the more prominent poets of the three Silesian schools.
4. What is the character of the writings of Lohenstein and Hofmannswaldau?
5. What were the principles involved in the controversy between Gottsched and Bodmer? Sketch rapidly the history and the result of the struggle.
6. Trace the development of the German novel (*Roman*) through the seventeenth and eighteenth centuries.
7. Give a concise account of the life and literary activity of Klopstock.
8. Give a complete list of Lessing's works, and the dates of his birth and death.
9. Sum up briefly the intellectual results of Lessing's life, define the principles for which he fought; his merits and his deficiencies as a dramatist.
10. What is understood by the Period of Enlightenment (*Aufklärung*)?
11. What are Wieland's characteristics as a man and an author?

12. State the leading traits of the Storm and Stress (*Sturm und Drang*) Period. What were its causes and what its results?

13. What were the ideas, foreshadowed or distinctly stated in Herder's writings, which have proved so fruitful to the science and literature of the present century?

14. Name those works of Goethe which are usually regarded as products of the Storm and Stress Period.

15. Give a rapid sketch of the life of Friedrich von Schlegel.

16. Give a criticism of Heinrich Heine as a lyric poet.

ICELANDIC.—PROFESSOR FISKE.

I.

Translate the following passage from the *Gunnlaugs Saga Ormstungu* (Section 11):

Nú búast menn til boðs um vetrinn. Þorkell frá Skáney bauð Illuga svarta ok sonum hans. Ok er Illugi bóndi bjóst, þá sat Gunnlaugr í stofu ok bjóst ekki. Illugi gekk til hans ok mælti:—"Hví býst þú ekki, frændi?" Gunnlaugr svarar:—"Ek ætla eigi at fara." Illugi mælti:—"Fara skaltu víst, frændi!" segir hann, "ok slá ekki slíku á þik, at þrá eptir einni konu, ok lát sem þú vitir eigi, ok mun þik aldri konur skorta." Gunnlaugr görði sem faðir hans mælti; ok kvámu þeir til boðsins, ok var þeim Illuga ok sonum hans skipat í öndvegi, en þeim Þorsteini Egilssyni ok Hrafni, mág hans, ok sveitinni brúðguma í annat öndvegi gegnt Illuga. Konur sátu á palli; ok sat Helga hin fagra næst brúðinni, ok renndi opt augum til Gunnlaugs; ok kemr þar at því sem mælt er, at *eigi leyna augu, ef ann kona manni.* Gunnlaugr var þá vel búinn, ok hafði þá klæðin þau hin góðu, er Sigtryggr konungr gaf hónum; ok þótti hann þá mikit afbragð annarra manna fyrir margs sakir, bæði afls ok vænleiks ok vaxtar. Lítil var gleði manna at boðinu.

1. *Give the principal inflectional parts of* búast, bauð, gekk, svarar, fara, skal, þrá, lát, vitir, görðu, kvámu, sátu, ann, *and* þótti.
2. *The derivation of* bóndi, frændi, ekki, eigi, aldri, mælti, öndvegi, leyna, afbragð, *and* gleði.
3. *The composition of the names* Þorkell, Gunnlaugr, *and* Illugi.
4. *Inflect through all cases of the singular and plural the phrase* Helga hin fagra.
5. *Explain the use of the pronoun in the phrase* þeim Þorsteini Egilssyni ok Hrafni.
6. *Give an account of the word* guma *in* brúðguma.
7. *What makes the vowel in* nú *long?*
8. *Give the changes caused by the* i-*umlaut and the* u-*umlaut, and illustrate them as fully as possible from the above passage.*

II.

Translate from *Hómers Odysseifsdrápa* (Book ix):—

En er sól var runnin og rökkur á komið, lögðum vér oss til svefns

á sjávarströndinni. En er hin árrisula, rósfingraða Morgungyðja kom í ljós, setti eg þing, og mælti í áheyrn allra:—"Mínir kæru félagar! þér skuluð nú vera hér eptir, en eg ætla að fara með skip mitt og lagsmenn mína, og vita, hverir menn þetta eru, hvort þeir eru ofstopamenn, villimenn og ójafnaðarmenn, eða gestrisnir menn og guðhræddir." Að því mæltu steig eg á skip, og bað förunauta mína fara upp í og slá skutfestum. þeir gengu þegar á skip og settust á þópturnar; og þegar hver var kominn í rúm sitt, lustu þeir árum hinn gráa sæ.

1. *Make a list of the words which would be differently spelt in Old Icelandic.*
2. *The principal parts of* runnin, setti, steig, bað, slá *and* lustu.
3. *The English cognates of* svefn, félagar, steig; *the German cognates of* nauta *in* förunauta *and of* og.
4. *Inflect* sjávar *in* sjávarströndinni.
5. *Explain the form* settust *and the derivation of the suffix.*
6. *Give the various possible significations of* á *as particle, verb, noun, etc.*

III.

Write out in prose the following stanza, and translate:—

Mana gramr við mik
(Venr hann gjöfli sik
þess man grepp vara)
Gullhring spara.
Segi hildingr mér,
Ef hann heyrði ger
Dýrligra brag;
þat er drápulag.

1. Give the name of this measure and explain its construction.
2. Explain fully the suffix *a* in *mana*.

IV.

Point out the *hendingar* and alliterative letters in the following:—

Lagðak orms at armi
Arms góða mér tróðu
(Guð brá Lofnar lífi
Lins) andaða mína.
þung var þorna spangar
þraut, en humra brautar
þó er beiðanda biða
Bliks þungara miklu.

1. What is the name given to the above measure?
2. What name is given to the verse in the stanza beginning

Roðit er sverð, en sverðan
Sverðrögnir mik gerði—

V.

1. *Write a brief résumé of the* Gunnlaugs Saga.
2. *Give the principal dates and incidents in the life of* Ari þorgilsson; *of* Snorri Sturluson; *of* Sturla þórðarson.

IV. ANGLO-SAXON AND ENGLISH LITERATURE.—PROFESSOR CORSON.

I. ANGLO-SAXON.

Give synopses of case-endings of the three declensions of nouns and of the definite and the indefinite declensions of adjectives. Give the plurals fisc, dæg, cræft, beáh, wíf, sceáp, heafod, bebód, fæt, spere, and the rules they follow. Decline bóc, bróðor, burh, cú, lús, mann, modor, turf, sunu. Decline, definitely and indefinitely, smæl, glæd, fæst, fæger, éce, grim, hálig, heáh, hræð. Compare strang, eald, geong, sceort, sófte, heáh, yfel, mycel, lytel. Decline, as possessive adjective pronouns, the genitives singular, dual, and plural, of the personal pronouns ic and þú. Give synopsis of the inflections of strong verbs. Give the parts of the verb that have the same root-vowel. Give the changes the root-vowel of the 1st pers. pres. indic. undergoes in the 2d and 3d pers. when the vowel of the endings -est and -eð is syncopated, and give the euphonic consonantal changes and omissions which then take place. Conjugate beorgan, yrnan, ceósan wesan, beón, dón, willan, habban, ágan, cunnan, witan. Give synopsis of the inflections of weak verbs. State peculiarities of the different classes of weak verbs and the euphonic consonantal changes and omissions which their conjugations present. Explain and give several examples of the use of the dative infinitive.

Read and Translate:

He sæde ðæt Norð-manna land wære swýþe lang and swíðe smæl. Eal þæt his man áþer oððe ettan oððe erian mæg, þæt lið wið ðá sæ; and þæt is þeáh, on sumum stówum, swýðe clúdig; and licgað wilde móras wið eástan, and wið upp on emnlange þæm bynum lande. On þæm mórum eardiað Finnas; and þæt byne land is eásteweard brádost, and symle swá norðor swá smælre. Eásteweard hit mæg bión syxtig míla brád, oþþe hwéne brædre; and middeweard þritig oððe brádre; and norðeweard, he cwæð, þær hit smalost wære, þær hit mihte beón þreora míla brád tó þæm móre; and se mór syðþan, on sumum stówum, swá brád swá man mæg on twám wucum oferféran; and, on sumum stówum, swá brád swá man mæg on syx dagum oferféran.

Explain construction of "his," in "Eal þæt his man." Explain "áþer oððe . . oððe; wið upp on emnlange; symle swá norðor swá smælre." What modern English phraseology is derived from A. S. construction like "syxtig míla brád?" Explain "hwéne."

2. CHAUCER.

1. Give the usual noun-declensions of Chaucer's English.

2. How is the definite form of adjectives distinguished from the indefinite? Give examples of the two forms. What definite adjectives are generally used without the distinctive endings? Examples. What is the usual plural form of adjectives? What adjectives usually drop the distinctive plural ending?

3. Give the usual inflections of weak verbs in the indicative mood, pres. and past tenses. What verbs end in *-t* in the third person sing.? Examples of each.

4. How do strong verbs form their past tense and their past participles? Past plural? Examples of each.

5. Give the inflections of the subjunctive mood, pres. and past tenses, sing. and pl.

6. Inflections of the imperative mood, sing. and pl.? Give examples. Infinitive endings? Examples. Which of the infinitive endings is most used? What generally determined the use of the other endings?

7. What two participial endings were in use in the English of the XIVth century? Which was generally used by Chaucer, and which by Gower?

8. How are adverbs formed from adjectives? from nouns? What is the usage of the language in regard to the employment of negatives, especially when emphatic? Give examples of the negative united with the verb.

9. In what respect did the accentuation of the English of the XIVth century differ from that of the present English?

10. State the various endings and inflections of the Anglo-Saxon of which the final *-e* of Chaucer's words is a residual or a representative.

11. What are the general rules in regard to the syllabic value of the final *-e* in Chaucer's verse?

12. Scan the following verses, and explain where the final *-e* is sounded, and where it is mute:

V. 38. To telle yow alle the condicioun.
53. Aboven alle naciouns in Pruce.
90. All ful of fresshe floures, white and reede.
102. At that tyme, for him lust ryde soo.
132. In curtesie was sett al hire leste.
148. But sore wepte sche if oon of hem were deed.
183. And I seide his opinioun was good.
221. Full sweetly herde he confessioun.
235. And certayn he hadde a mery noote,
249. And overal, their eny profyt schulde arise.
311. A Sergeant of Lawe, war and wys.
341. An househaldere, and that a gret, was he.
385. He cowde roste, sethe, broille, and frie,
Make mortreux, and wel bake a pye.

417. He kepte his pacient wondurly wel.
535. And thanne his neighebour right as himselve.
557. His nose-thurles blake were and wyde.
A swerd and a bocler baar he by his side.
567. A gentil Maunciple was ther of a temple.
767. For trewely comfort ne merthe is noon.
823. Ye woot youre forward, and I it you recorde.

III. ENGLISH LITERATURE.

NO. I.

[*Each student will receive four or five connected questions, the answers to which are to be embodied in an Essay written during examination hours. The literary merits of the Essay, as well as the correctness and fullness of the answers given, will be taken into account.*]

1. Name the chief literary productions of the 14th century that claim the student's special attention.

2. What is the character of the Vision of William concerning Piers the Plowman? In what does its great historic value consist?

3. What dogma of the church was the special object of Wyckliffe's condemnation?

4. What are the literary merits of the Wyckliffite versions of the Scriptures?

5. What previous attempts at vernacular translation had been made in England?

6. What influence was exerted by the Wickliffite versions, upon subsequent versions?

7. What noteworthy circumstance in the history of the literatures of Protestant countries, is connected with the translation of the Scriptures into the vernacular?

8. What qualifications did Chaucer possess for becoming a great national poet?

9. What were the chief obstacles to his continued popularity, after the close of the 14th century?

10. What dramatic advantages has the plan of the Canterbury Tales over that of the Decameron of Boccaccio?

11. How is the literary dearth of the 150 years succeeding the death of Chaucer, to be partially accounted for, and upon what was the best productive mind of the nation during that time chiefly expended?

12. Who were the principal poetic representatives of this period? State what you know about them and their works.

13. What are the claims of the Earl of Surrey to his rank in English literature?

14. What is the character of "The Mirrour for Magistrates"? By whom was it planned and what did he contribute to it?

15. In what grand respect did Spenser differ from his cotemporaries and his immediate successors, especially Shakespeare?

16. Define the terms Classical and Romantic as applied to the two schools of literary art which, in Spenser's time, in England and on the continent, were struggling for the ascendency.

17. How may the Faerie Queene be characterized in respect to its relation to the two schools of literary art, the Classical and the Romantic?

18. What influence has been exerted by Spenser on English poetry, and in which of the modern poets is his influence most apparent?

19. State the chief distinguishing characteristics of Shakespeare's dramatic art.

20. In what does his great superiority to Jonson in the delineation of character, chiefly consist?

21. Upon what principle does Shakespeare seem to have proceeded in always working upon the basis of a previously existing story or play? And in thus working, how does his genius especially show itself?

NO. 2.

1. Give the four distinct periods into which Milton's authorship may be divided.

2. What were Milton's views as to the qualifications of a great poet?

3. State Macaulay's theory as to the requisites of success in the exercise of poetic genius.

4. What do you understand by a poetic reflection of an age? And why are great poets the truest historians?

5. What is it that makes Milton the great central figure of his age?

6. Compare Dryden with Milton as a reflector of his age.

7. Give an account of "the Collier Controversy."

NO. 3.

1. What was the occasion of Pope's Rape of the Lock? What were Pope's models in its composition?

2. State the relations of the poem to Pope's time.

3. In what form of poetry did the spirit of his age find its best embodiment?

4. Give an account of the Ossian controversy.

5. What good influence was exerted upon English poetry by Bishop Percy's Reliques?

6. State as fully as you can what you consider Cowper's relations to have been to the great revival in English poetry.

7. Trace succinctly the progress of the revival and the opposition it met with up to its culmination in Wordsworth.

4. CRITICAL READING.

MILTON'S LYCIDAS.

Give the occasion of the composition of the poem, and analyze

its structure. Explain as minutely as possible the ecclesiastical allegory running through it. In what different senses have the five opening lines been understood? v. 1, force of "yet?" v. 3, "crude," original meaning? What other English word has the same root? v. 6, "sad occasion dear;" give several other examples from Milton of this arrangement of epithets. Explain "dear." Give examples from Shakespeare of this use of the word; Craik's explanation? Horne Tooke's etymology? v. 7, "Compels," why used in the singular? "to disturb your season due?" Explain. v. 8, "Lycidas;" where did Milton get this name for his shepherd, and why did he probably choose it? Etymological meaning of the name? v. 11, "rhyme;" correct etymology of the word? Why was the "h" introduced in the spelling? v. 13, "welter;" etymology of word? What other English verbs have the same root? "to," force of? Give other examples from the poem, of this use of the word. In what present English phrases is it still so used? v. 14, "melodious tear," explain. v. 20, "lucky words;" explain the epithet. v. 22, "sable shrowd," explain; etymology of "shrowd?" v. 23, *et seq.*, explain biographical allusion. v. 33, "oaten;" what form have adjectives in -en given place to in present English? What change in meaning have those that are retained, undergone? v. 38, "must," force of? v. 47, "wardrop," what is the usual order of the elements of a compound word? How is the order in "wardrobe" accounted for? v. 49, "such," force of? v. 55, "wisard," propriety of the epithet? original force of -ard? usual present force? Give other examples. In what word has it been corrupted? v. 59, "inchanting," explain the epithet. v. 61, "the," force of? v. 64, "boots," etymology of word? "uncessant." What is the present rule in regard to the use of un- and in-? v. 64–69, explain the allusion. v. 67, "use," modern use? v. 75, "Fury," how does the poet use the word here? v. 76, "life," what figure? v. 79, "in the glistering foil," construe. v. 81, "by," force of? v. 82. "perfet," explain the form. v. 85, "honour'd," explain the epithet. vv. 87, 88, explain. v. 90, "in Neptune's plea," explain. v. 93, "every," etymologically = what? difference between the uses of "each" and "every?" v. 97, "was stray'd," what distinction was formerly observed in the use of *be* and *have* as auxiliaries? Difference between "is come" and "has come?" v. 101, "th' eclipse," force of "the?" "with," force of? v. 103, "went," what would be used in present English? Derivation and original sense of "went?" v. 104, what is the allusion? v. 106, "Like," construe. v. 110, "twain," three uses of, in Elizabethan English? v. 111, "amain," etymology, and force of the word here? v. 112 "bespake," give other examples from Milton of this use of the word; what force has be- in present English? v. 114, "Anow," difference, originally, between the use of "enow" and "enough?" v. 119, "Blind mouthes!" Is Hale's explanation acceptable? What other explanation would make the expression more poetic? v. 120, "the least," construe. v. 121,

"faithfull," what has probably caused the dropping of one l in present spelling? v. 123, "list," its derivation and earlier use? In what word does it survive? And to what other word is it akin? v. 126, "draw," in what form is the word still used in this sense? v. 129, "and nothing sed," explain construction of this phrase. vv. 130, 131, to what are these two lines generally understood to allude? but what is their more probable meaning? vv. 132, 133, "Return, Alpheus, ... return, Sicilian Muse," explain. v. 134, "bid them hither cast," what is involved in "hither?" v. 138, "swart star," force of epithet? v. 140 "quaint," etymology, and force of here? v. 142, "rathe," what form of this word is still in use? What other form is found in Shakespeare and earlier writers? Where has Tennyson used "rathe?" v. 149, "his:" give history of the present neuter genitive "its." v. 151, "laureat herse," explain "herse," and give examples of its earlier use; explain the epithet. v. 152, "so," force of? v. 158, "monstrous" =what? v. 159, "moist vows," develop; v. 160, "fable of Bellerus old," what rhetorical figure? vv. 161–163, explain the ecclesiastical meaning of these lines; "ruth," in what modern English word does it survive? in what verb? explain the form. v. 166, "your sorrow," what rhetorical figure? Give examples of other abstract nouns used in a concrete sense; examples from the Latin and Greek; v. 173, "that walk'd the waves," after what class of intransitive verbs was it common in Elizabethan English to omit the preposition? Give examples from Shakespeare. What difference in meaning is there in "walk'd the waves" and "walk'd on" or "walk'd o'er the waves?" Which is the more poetic, and why? v. 176, "unexpressive," explain the use of adjectives in -ive and -ible, in Elizabethan English, and give examples, from Shakespeare, of such adjectives used in a passive and in an active sense; v. 184, "thy," personal, or possessive adjective pronoun? "good," force of? Any like use in modern English? v. 185, "that wander in that perilous flood," what force has "in" here, different from what "on" or "o'er" would have? v. 186, "uncouth," radical and derivative meanings? meaning here? v. 189, "thought," force of? "Dorick," explain the epithet; v. 190, "stretch'd out all the hills," explain; what equivalent expression in Virgil's Eclogues? v. 192, "twitch'd," explain; "blew," why this epithet? v. 193, explain this verse.

V. MATHEMATICS.

[*The subjects in this department are distributed among the several Professors differently during successive years.*]

I. ALGEBRA—PROFESSORS BYERLY AND WAIT.

1. Find all the commensurable roots and one incommensurable root of the equation $x^5 - 4x^4 + 13x^3 - 47x^2 + 80x - 44 = 0$.

2. Find a formula for the sum of n terms of an arithmetical progression by making it depend on the $(n + 1)$st term of a new series, and show that your formula is identical with the one found by the usual process.

3. Find the logarithm of 8608; interpolating in your table by the aid of the formula for the $(n + 1)$st term of a series.

4. Develop $\sqrt{1 + x}$ into a series by the binomial theorem, and also by the method of undetermined coefficients.

5. Compute the logarithm of .002, to the fourth approximation by the method of continued fractions.

6. Calculate by logarithms the value of the expression

$$\sqrt[10]{\left[\frac{(4.275)^3 + \sqrt[4]{26.41} \times 0.0832}{0.09628 \times \sqrt{\frac{623}{1785}}}\right]^7}$$

2. TRIGONOMETRY—PROFESSORS ARNOLD AND WAIT.

1. Define the six principal trigonometric functions of ϑ, as *ratios*; and extend the definitions to the case of angles $<0°$ and $>90°$. Find eight fundamental relations among them, *for all values of* ϑ. Obtain $\sin \vartheta$ in terms of $\tan \vartheta$.

Show what lines, drawn to a circle whose radius $= 1$, have the same values as the trigonometric functions or ratios. In what sense can a line and a ratio be said to have the same value?

Write out the six functions of $-\vartheta$, $\frac{1}{2}\pi \mp \vartheta$, $\pi \mp \vartheta$, $\frac{3}{2}\pi \mp \vartheta$, $2\pi \mp \vartheta$, $-5\pi \mp \vartheta$, in terms of those functions of ϑ which express them most simply. What relation has this problem to the mode of using trigonometric tables?

Give the six functions, also versin, coversin and suversin, of the following angles: 0°, 60°, 120°, 225°.

2. Write formulæ for $\sin(\alpha \pm \beta)$ and $\cos(\alpha \pm \beta)$. How do you know that these formulæ are true even when α and β are not between 0° and 90°? Illustrate by the case of $\sin(\alpha + \beta)$.

Proceeding from these, find formulæ for $\tan \frac{1}{2} \vartheta$ and for

$$\frac{\sin \gamma + \sin \delta}{\sin \gamma - \sin \delta}.$$

3. In quadrilateral $ABCD$, let $AB = 80$, $BC = 70$, $CD = 60$, $DA = 50$, $AC = 40$; and find BD. Use four-place logarithms; and estimate, roughly, the degree of accuracy in your result.

4. State Napier's rules for spherical right triangles; and demonstrate, using Evans's method.

5. Find, in nautical miles, the length of the shortest path from a point off Cape Horn, in 57° S. lat. and 67° W. long., to a point in 43° 15′ S., 147° 30′ E. off Hobarton. In sailing upon this track, how must I steer at first?

3. PLANE ANALYTIC GEOMETRY.

1. The centre of gravity of two heavy points is known to divide

internally the line that joins them, in the inverse ratio of their weights. Let the points P_1, P_2, P_3 have the weights m_1, m_2, m_3; and let the point P_{23}, at the centre of gravity of P_2 and P_3, have the weight $m_2 + m_3$, and similarly with P_{31} and P_{12}. Prove that P_1 and P_{23} have the same centre of gravity as P_2 and P_{31}, or as P_3 and P_{12}.

What properties of plane triangles can you deduce from this: and what theorems concerning centres of gravity for many bodies?

2. Rectangular equations of two lines; the first containing point $(-2, 3)$ and making the angle $-45°$ with axis OX; the second, containing points $(2, 3)$ and $(-4, -6)$.

Distance of each line from the origin; intercepts on the axes; distance of the lines' intersection from point $(1, 1)$; tangent of their angle of inclination.

Transform the lines' equations to oblique coordinates whose axes make angles $+30°$ and $+60°$ with OX, and whose origin is $(1, 1)$; also to polar coordinates whose origin and axis are O and OX.

3. Rectangular and polar equations of the circle that contains points $(0, 0)$, $(1, 7,)$ $(7, -1)$. Show when its radius vector becomes negative, and interpret this result.

4. Prove that the tangent at any point of an ellipse or hyperbola is equally inclined to the two lines from that point to the foci. What is the corresponding theorem for the parabola, and why?

5. Prove that every equation of the second degree represents an ellipse, a parabola, a hyperbola or right lines.

6. Through a fixed point O passes a moving line that cuts a given hyperbola in points P', P''. Find locus of that point P on the line, which divides $P'P''$ harmonically with respect to O.

4. SOLID ANALYTIC GEOMETRY—PROFESSORS BYERLY AND WAIT.

1. Find, by projections, the cosine of the angle between two lines, in terms of the lines' direction-cosines.

2. Write the equation of the plane, in four of the most important and dissimilar forms; interpret each, and show whether it extends to oblique coordinates, and how obtained.

3. Find the shortest distance between two non-intersecting diagonals of adjacent faces of a given cube.

4. Locus of equations $U = V = W = 0$; of $U = VW = 0$; of $U + k . V = 0$; of $UV + mUW + nVW = 0$; where $U = 0$; $V = 0$, $W = 0$ represent any surfaces.

5. Classify the surfaces $Ax^2 + By^2 + Cz^2 + 2Lx + 2My + 2Nz = 0$, by referring to new coordinate axes so as to simplify their equations.

5. HARMONOID GEOMETRY.

(*Use symmetric methods by preference.*)

1. By theory of permutations, how many essentially different

harmonoid ratios are determined by four given elements? Show that each of these ratios fixes all the others unambiguously; and utilize this in defining homography.

Show that either harmonoid of a pencil, if defined by the aid of the sines of the angles, is independent of the choice of positive direction on either ray; and that the above discussion applies to such harmonoids.

Prove that a pencil of $2n$ rays cuts any transversal homographically. Resulting theorem for two pencils or ranges, and its converse. Cases where one intersection is at infinity, and where two corresponding elements are identical. Methods of completing a pencil or range homographically to another.

2. Distinguish descriptive from metric relations. What classes of either are projective, and why?

Prove that any four tangents to a conic meet any fifth tangent in a range homographic to the pencil of rays that join the four points of contact to any fifth point on the curve.

3. Obtain and reciprocate Pascal's theorem.

Given five points on a conic, draw a tangent at either; also find where the conic meets a given line through either point. Reciprocate these problems.

Through a given point, draw a line to the unseen intersection of two given lines.

4. Establish the fundamental theorems of involution by Evans's method, from the properties of the completed quadrilateral.

6. CALCULUS—PROFESSOR OLIVER.

ONE-TERM COURSE.

1. Define Curvative, Osculating Circle, Radius of Curvature, Centre of Curvature, Evolute. What are the two most important properties of the evolute of any curve?

2. Find the length of the radius of curvature of the curve $x^2 = 4y$ at the point whose abscissa is 2.

3. Find at what point of the curve $x^2 = 4y$ the radius of curvature will be a minimum.

4. Give the reasoning in full of the method of determining by integration the centre of gravity of a parabolic segment.

Example.—Find the coordinates of the centre of gravity of the segment of the parabola $y^2 = 2mx$ cut off by the double ordinate through (x_1, y_1).

7. CALCULUS—PROFESSORS OLIVER AND BYERLY.

FULL COURSE, EXTENDING THROUGH THREE TERMS.

1. Explain the terms "limit," infinitesimal," "order of infinity," "derivative," "differential" or "virtual increment," "difference" or "increment."

Compare the method of limits, that of infinitesimals, and Lagrange's; and show that all three are rigorous.

Show that integration, defined as a certain limiting case of summation, is the inverse of differentiation. Explain its relation to the arbitrary or undetermined constant, and the theory of definite integrals.

Likewise illustrate all the above topics by aid of a curve, or of a moving point.

2. Show that $\lim (1 + i)^{\frac{x}{i}}$ can, by assigning a suitable law to the infinitesimal i, be developed by the binomial theorem for positive integer exponents; and that it converges.

Obtain the derivative of e^x; of $\log x$.

3. Differentiate $\sin^{-1}\dfrac{a+b\sin 3\sqrt{x}}{b+a\sin 3\sqrt{x}}$.

4. Express $D_x{}^3y$ in terms of derivatives of x with respect to y.

5. Write Taylor's Theorem in two forms. Develop $\sin x$ and $\cos x$. Obtain De Moivre's formulæ, and describe the six hyperbolic functions.

6. Investigate the conditions for a maximum or minimum in a function of two variables. Apply to the function $xy(1 - 2x - 3y)$.

7. Prove that at any point of a surface the sum of the curvatures of mutually perpendicular normal sections is constant.

8. Integrate $\dfrac{dx}{a^2-x^2}$ into both logarithmic and hyperbolic forms.

Obtain the integral $\displaystyle\int\frac{dx}{x} = \log x + C$ from the general form of $\displaystyle\int x^m dx$.

9. Integrate $\dfrac{2+3x}{(x^2-x+1)^2}\,dx$.

10. Show how to integrate every rational function of x and $\sqrt{(ax^2 + bx + c)}$, by introducing an auxiliary angle.

11. Show when $x^m(a + bx^n)^p dx$ is integrable. Explain the methods of reduction by which either m or p can be increased or diminished.

12. Integrate $(ax + by + c)dx + (a_1x + b_1y + c_1)dy = 0$.

13. Obtain the singular solution of equation $a^2(dy^2 + dx^2) = (ydx - x\,dy)^2$; and explain the relation of singular solutions to envelopes.

14. Find the orthogonal trajectories of the system of circles with a common chord, $y^2 + x^2 x - 2a = b^2$; where a varies.

8. DESCRIPTIVE GEOMETRY.

[*Students, in all the courses, are admitted to the class in Descriptive Geometry as optional students. But the study is required in the course in* ARCHITECTURE, CIVIL ENGINEERING,

and in MECHANIC ARTS. *The subject is taught under the supervision of the Professor in Civil Engineering.*]

I. FIRST TERM.

2. Find the angle an oblique plane makes with the ground line.
3. Through a line draw a plane perpendicular to a given plane.
6. Draw a plane tangent to a cone and parallel to a given line, the axis of the cone being in the ground line.

II. SECOND TERM.

1. Find the projections of a cone, having a circular right section, when taken oblique to the planes of projection; and the development of the surface between the vertex and the horizontal plane.
2. Find the intersection of a plane with a cylinder having its axis in the ground line.
6. Given one element of the first, and three of the second generation, of a hyperbolic paraboloid—the element of the first generation passing through the vertex of the surface—and a plane, containing the element of the first generation; to find the point where the plane is tangent to the surface.
7. A village lot is divided into squares, and the references of the corners determined; find the cut or fill at each corner, and the number of cubic yards of earth to be removed to reduce the surface to a given uniform grade.
9. Through a line pass a plane perpendicular to a given plane and find its scale of declivity.
10. Draw a normal line to the skew arch soffit at a given point of the surface.

VI. NATURAL HISTORY.

I. PHYSIOLOGY—PROFESSOR WILDER.

1. State the chemical resemblances and differences between butter and sugar.
2. State the general object of digestion.
3. State the functions of the pancreatic juice.
4. Define tidal air and state its average amount.
5. Make a diagram of gray and white nervous tissue: state where they occur and their properties.
6. State the difference between plasma and serum.
7. Give a diagram of both sides of the heart; indicate the source, nature and destination of the blood currents.
8. Give a diagram of the hepatic circulation; indicate the source, nature and distribution of the blood, and the changes produced by the liver.
9. State the difference between coma and syncope, and indicate their treatment.

10. Name three common clothing stuffs in the order of their protection against cold.
11. Give a diagram of a vertical section of the skin.
12. State the effect of irritating the anterior root of a spinal nerve *inside* of a section through it.
13. Name the essential ganglia of the brain in their order from behind forward.
14. Give a diagram of the tympanum and its contents.
15. State the structure, position and properties of the "blind" and the "yellow" spots upon the retina.

2. PHYSIOLOGICAL BOTANY—PROFESSOR PRENTISS.

1. What are the essential characters of a typical flower?
2. Explain the theoretical structure of the pistil.
3. Distinguish between free and distinct, cohesion and adhesion, pinnate and pinnatifid.
4. Explain the structure of a flower of Compositæ.
5. In what plant is the greatest amount of pollen secreted? Why?
6. What is assimilation? Where and under what conditions does it take place?
7. Show that a flower is homologous with a branch.
8. State some of the distinguishing characteristics between Trillium grandiflorum and T. erectum.
9. Mention ten trees indigenous to New York, and state the Natural Order to which each belongs.
10. What change in structure would convert a raceme into a corymb?
11. State the leading botanical characters of each of the following orders: Rosaceæ, Leguminosæ, Crucifera, Ranunculaceæ.
12. Define Genus, Species, Order. State the origin of generic, specific, and ordinal names.
13. Draw diagrams to show: 1. Ovary free. 2. Ovary adherent. 3. Excurrent stem. 4. Versatile anther. 5. Introse anther. 6. Imbricate æstivation. 7. Valvate do. 8. A petiolate, ovate, cordate, serrate leaf with stipules.
14. Characterize the different kinds of plant tissue.
15. Name six natural orders largely represented in the flora of Ithaca.
16. What are four of the most important orders in temperate regions in regard to their useful products?
17. Explain some structural provisions in plants which aid in their dissemination.
18. What substances constitute the principal food of plants?
19. Describe the different shapes of monopetalous corollas.
20. Explain the terms diœcious and monœcious.
21. Give examples of common diœcious plants.
22. How do ordinary tendrils act?

23. Of what advantage is it to a plant to climb?
24. Explain the general structure of a leaf.

3. ZOOLOGY—PROFESSOR WILDER AND MR. COMSTOCK.

1. What kinds of groups are usually admitted among animals?
2. Characterize the Vertebrates.
3. Characterize *Amphioxus*.
4. Give a longitudinal section of *Amphioxus*.
5. Give a longitudinal median section of the branchial region of *Petromyzon* (the lamprey).
6. Characterize the larval form of *Petromyzon*.
7. Give the geographical distribution of the existing Ganoids, including the Dipnoans.
8. Give in three vertical columns the constant and peculiar characters of the Ganoids, Selachians, and Teleosts.
9. Describe and figure the development of a frog.
10. Describe peculiar forms of gestation among Batrachians.
11. Give a diagram of a frog's brain from above.
12. State the resemblances and differences between Reptiles and Birds.
13. Name fossil forms which seem to connect the two classes.
14. Characterize the Mammals.
15. Give a diagram of an embryo opossum.
16. Name and give an account of the simplest organism known.
17. Describe the development of a free-swimming medusi-form reproductive bud.
18. Give an account of the coral-making *Zoantharia*, noticing especially the following points:—Relation of coral to body of polyp, modes of reproduction, forms of coral communities as resulting from different modes of increase or growth, and the distribution in latitude, and in depth, of the reef-building species.
19. Give an account of the Pork Tape-worm of man, (*Taenia solium*).
20. Characterize the Spiders, (*Araneida*).
21. Give tabular arrangement of the typical mouth-parts of an insect.
22. Explain the terms, larva, pupa, chrysalis, complete metamorphosis and incomplete metamorphosis.
23. Describe a fresh-water Polyzoon.
24. Discuss the zoological position of the *Brachiopoda*.
25. Describe shell of an *Orthoceras*.

GEOLOGY—MR. DERBY.

[*Any one of the first five questions may be omitted.*]

1. Describe the successive steps in the formation of a mountain chain.

2. Name the geological period in which each of the principal mountain ranges of North America was upheaved.

3. In what period did Trilobites appear: culminate: disappear?

4. Name, in the order of relative importance, the classes of animals and plants represented in each of the great ages of geological history.

5. Give the evidence upon which the existence of a continental glacier in northern North America is based.

6. Given in ascending order a series of inclined beds consisting of—

1st. Coarse conglomerate.

2d. Nonfossiliferous sandstone.

3d. Shale with *Graptolites* and *Trilobites*.

4th. Limestone with *Trilobites*, *Brachiopods* and *Orthoceratites*.

Resting unconformably on these are—

5th. Horizontal beds of sandstones and shales, with Ferns, *Sigillarias* and *Lepidodendrons*, interstratified with beds of coal.

6th. Drift.

Translate, as fully as possible, the history recorded in this section, and give approximately the geological age of the beds.

VII. MORAL AND INTELLECTUAL PHILOSOPHY.— PROFESSOR WILSON.

[*The examinations in this Department are conducted by means of a Syllabus of the lectures on each subject, the questions and topics of the Syllabus are divided into sets, with five or more in a set, one of which is drawn by lot by each student at the time of the examination, and the answers and discussions are written in the presence of the professor. The following are given as examples, only two or three from each Syllabus:*]

I. PSYCHOLOGY.

I.

1. What is the relation of the Body to the Mind?

21. What is Materialism in relation to Psychology?

41. What is false perception, and on what conditions may it occur?

61. What are the appetites, and how are they related to the excito-motor emotions?

81. Explain the difference between the æsthetic and the ethic emotions in reference to their origin.

101. What is the difference between volition and choice?

VI.

6. Describe and name the ganglia of the sensorium.

26. Can voluntary action be distinguished from involuntary action by the mere observer? Why not?

46. What are the reasons for regarding the optic thalami as the organ of the sense of touch?

66. How are affections influenced by the voluntary control of thought?

86. What reason is there to suppose that the emotions of self are influenced by difference of physical organization?

106. State the changes in the character of the life of an individual as he passes from infancy to old age.

XIX.

19. What influence have the excito-motor and the sensori-motor emotions upon the character and habits of life?

39. What would be our condition in relation to knowledge of external objects, if we had no sense of touch?

59. Explain the four processes by which nouns as names of things are formed.

79. What are sentiments? and how do they differ from judgments?

99. Why cannot we prove as a matter of fact that animals have volition?

119. What changes take place in the character of memory as we pass from childhood to old age?

2. MORAL PHILOSOPHY.

[*Each student writes an essay on one of the following topics drawn by lot at the time of writing it:*]

1. The nature and limit of Moral Action.
2. The influence of theories of Morals on character.
3. The Moral character of Acts as distinct from the Guilt or Innocence of the Agent.
4. Reflex-action in its relation to Freedom of Will.
5. Æsthetic Culture and its relation to Morality.
6. Benevolence as a Sentiment and as a Principle.
7. The Duty of Truthfulness and the extent of its obligations.
8. The Duty of Justice as between Man and Man.
9. The Rights of the State as against Subjects.
10. Citizenship as a Natural Right.
11. Religion as a Natural Duty.
12. In cases of conflict of Duties, what general rules may be given as our guide in determining what is our Duty?

3. LOGIC.

I.

1. Explain the nature and province of Logic. What are its relations to Psychology?

21. What is the fallacy of Undistributed Middle? When will it occur? Why can there be no Universal Conclusion after a Partial Premise?

41. Explain what is meant by "the presumption," "the probability," and "the certainty of propositions." How many kinds or degrees of certainty are there?

Analyze and explain examples 6, 22, 99.

V.

5. What is synthetic reasoning? Why do we call it *a posteriori*? What are the four relations of things on which it depends?

25. What is a *Sorites?* How may its validity be tested (1) by reduction to syllogisms, (2) by general rules?

45. What are "examples?" what "exceptions?" and their relations to each other? Explain the method and fundamental principle of induction.

Analyze and explain Examples 5, 30, 114.

X.

10. When do separable accidents become essential? When essentia and differentia? What is artificial classification, and how does it differ from natural classification?

30. What are disjunctive syllogisms, and the ways of completing them? What is Excluded Middle?

50. Explain the relation of Logic to Rhetoric, and the difference between them in reference to argumentation.

Analyze and explain Examples 14, 53, 102.

XV.

15. Explain "immediate inference" by composition (§§ 93, 94.) What is the fundamental law in regard to the force of negatives?

35. What is Ambiguous Middle? Give and analyze an example. How does this differ from Undistributed Middle?

55. What is the difference between refuting one's *reasoning* and refuting his *conclusion?* How can the former be done? What is the effect of it?

Examples 18, 39, 115.

XX.

20. What is the Fallacy of Negative Premises? Why may there be no conclusion after two Negative Premises? Why no affirmative conclusion after one Negative Premise?

40. May a syllogism be at the same time a fallacy in form and in diction? What is necessary to detect a fallacy in diction? Why?

60. Explain the difference between direct and indirect refutation. What are the three kinds of indirect refutation?

Analyze and explain Examples 24, 45, 138.

4. HISTORY AND CRITICISM OF PHILOSOPHY.

V.

5. Describe and define the six classes of nouns: (1) individual,

(2) abstract, (3) general, (4) collective, (5) privative, and (6) negative.

25. Give an account of the Sophists; of Socrates; and the origin of the word "philosophy."

45. State Comte's objection to consciousness, as a means of knowledge. What would be the consequence of accepting it?

65. What is meant by the word "*faculty*," as applied to the mind? What influence has the philosophy of Reid had upon this use of words, and the views of the nature of the mind?

85. What is meant by calling God "the Absolute," "the Infinite," etc.? What is the law of the English language, in regard to the use of the article before adjectives? How does it differ from the Greek usage?

X.

10. What is the law with regard to the quality of nouns that may be connected by conjunctions? The reason for it?

30. To what department of Philosophy did Aristotle chiefly devote himself? What was his attitude in regard to Plato's theory of ideas?

50. What is "substance," as distinct from "property"? What are the three significations of the word "substance"?

70. Do we know the mind as object, or as cause only? Explain the difference?

90. What is Cousin's theory of "the origin of the idea" of God? What does he mean by calling God "the Universal Reason"? What inference may we draw from this, as to the nature of God?

XVII.

1. State some of the changes that may be made in propositions and show the analogy between this method and mathematical analysis.

2. What was Kant's theory of knowledge? What was Fichte's application of it to the external world?

3. In what sense is every object in nature "a cause"? in what "a force"? Are "cause" and "force" abstract or concrete terms when so used?

4. What was Cousin's theory of "ideas" in relation to the acquisition of knowledge?

5. Show that every object in nature and every state of an object may be regarded as a term in a series, (1) with regard to organic beings, (2) to inorganic.

XX.

1. State and illustrate the principle of identity and contradiction as a test of truth.

2. What is Sir William Hamilton's theory of knowledge—"presentative" and "representative"? What its relations to the materialism of Herbert Spencer?

3. Are there any "causes" or "forces" in nature besides material objects? What are "laws"—"the laws of Nature"?
4. What proof have we that the mind or soul is immaterial? What is the bearing of this on the doctrine of immortality?
5. What attributes do the acts of "creation" in the origin of "species" and "series" imply in the Beings who performed them? What influence does the certainty of such acts have on our expectations of a Special Providence and miraculous interpositions after creation was completed?

VIII. PHYSICAL SCIENCES.

1. CHEMISTRY.—PROFESSOR SCHAEFFER.

1. Explain the following terms:—atom, molecule, element, symbol, formula, atomic weight, molecular weight, equivalence.
2. What is meant by the law of definite proportion—law of multiple proportion? Give examples.
3. When the same elements unite in more than one proportion how are resulting compounds named?
4. What is a compound radical?
5. What is an acid? a base? a salt? How are they named?
6. What is a normal salt? What an acid salt?
7. Explain the relation between the density of a gas and its molecular weight. Give examples.
8. The molecular formula of a substance being given how may its percentage composition be obtained?
9. Give the distribution, preparation and properties of chlorine and sulphur.
10. Explain the process of combustion.

2. PHYSICS—PROFESSOR ANTHONY.

I. MECHANICS.

1. Define the terms (*a*) force, (*b*) work, (*c*) energy, (*d*) resultant and (*e*) component.
2. Define the terms (*a*) velocity and (*b*) acceleration.
3. A force of 8 kilogrammes acts toward the right, another parallel force of 6 kilogrammes acts toward the left at a distance of 12 c. m. from the first. Determine completely the resultant.
4. When a body is moved by a constant unbalanced force, (*a*) what is the nature of its motion? (*b*) What is the relation of the acceleration to the force and mass? (*c*) What relation between time and velocity acquired? (*d*) Between time and space passed over? (*e*) Between velocity and space?
5. A body A moves in the arc of a circle of 5 ft. radius with a velocity of 30 ft. A body B moves in a circle of one-half the radius with one-half the velocity. What is the ratio between the centrifugal forces developed?

6. (*a*) What is the relation between the ordinary and absolute units of force, if feet and seconds are the units of length and time respectively? (*b*) What if yards and minutes are the units of length and time?

7. What is the resultant of the forces 5 and 7 making an angle of 120°?

8. Find the centre of gravity of a circular disc of which one half is iron and the other half wood, joined along a diameter of the disc, the iron being 8 times as heavy as the wood.

9. (*a*) A mass of 100 lbs. moves with a velocity of 500 ft. What is its energy in ft. lbs.? (*b*) How far would it penetrate into a bank of earth offering a constant resistance of 100 lbs.?

10 How high will a body rise when projected upward with a velocity of 1000 feet?

11. How is the pressure due to the weight of a liquid computed?

12. State the principle of Archimedes.

13. (*a*) State Mariotte's law. (*b*) How can it be demonstrated experimentally?

14. Into what space will a quantity of air measuring 1 cu. ft. at the standard atmospheric pressure be compressed by a column of water 330 ft. high in an open tube (33 ft. = 1 atmosphere)?

II. ELECTRICITY AND MAGNETISM.

1. *a*. Describe the phenomena of statical induction. *b*. Apply to electrophorous and Holtz machine.

2. What are the general laws for the mutual action of electric currents? Apply to the case of a radial current flowing from the centre outward, acted upon by the earth current.

3. A Battery of 40 cells, each of 2 ohms resistance, and E. M. F. 1 volt, is arranged in series and the current divided between three telegraph lines, respectively of 3500, 7000, and 6500 ohms resistance. *a*. What is the entire external resistance? *b*. What is the entire resistance? *c*. What is the entire current? *d*. What current will flow through each line?

4. Describe the experiments to be performed to obtain the strength of a current in absolute measure.

5. *a*. Give the general law for the direction of an induced current. *b*. What current will flow through a vertical wire forming part of a closed circuit, when the wire is moved southward? *c*. When it is moved eastward?

III. HEAT.

1. What is meant by the coefficient of expansion of a body? Coefficient of apparent expansion of a liquid? In a centigrade thermometer, what must be the relation between the volume of the tube between 0° and 100°, and that of the bulb including that portion of the tube below 0°?

2. What is the theoretical velocity of air in a ventilating flue whose height is 50ft. and temperature 27° C., the external temperature being 7° C.?

3. Describe ebullition and the accompanying phenomena. What is the tension of the vapor from a boiling liquid? Effect of pressure on the boiling point. Why?

4. Water is compressed $\frac{46}{1000000}$ of its volume by a pressure of one atmosphere, what force will be required to resist the expansion for an elevation of temperature of 20°? coef. of expansion .00024.

5. Which has the greater density, air at 10° and pressure 70, or air at 30° and pressure 80?

6. What is meant by the "Spheroidal State?" State what facts you know in connection with it.

7. What is the unit of heat? What is specific heat? A body weighing 5 grammes is heated to a temperature of 100°, then plunged into 10 grammes of water at 10°, the common temperature finally reached is 12°. Required spec. heat of body.

IV. ACOUSTICS AND OPTICS.

1. (*a*) What is meant by a musical interval? Compute the intervals between the tonic and each note (*b*) of the major scale, (*c*) of the minor scale. (*d*) Point out the difference between the two scales.

2. Give the evidence that sound is propagated through the air by a vibratory motion.

3. *a*. What are laws of regular reflection of light? *b*. Where is the image caused by reflection from a plane mirror? *c*. Where is the image produced by a concave mirror, if the object is at an infinite distance? *d*. What changes will take place in the position and size of the image produced by a concave mirror, if the object approach from an infinite distance to very near the mirror?

4. *a*. What are the laws of refraction of light? *b*. Show in what way a prism deviates the rays. *c*. What is meant by the minimum deviation by a prism, and when does it occur?

5. *a*. State the evidence in favor of the undulatory theory of light. *b*. What evidence in relation to the direction of the vibration? *c*. How does a thin piece of selenite restore the light when placed between the polarizer and analyzer? *d*. How are the colors in this experiment accounted for?

3. ASTRONOMY—PROFESSOR POTTER.

I. Explain the difference between Sidereal and Solar days.

II. Explain the origin of the elements composing the Equation of time, and show the relation of that Equation to apparent and mean time.

III. Give the amount, and explain the cause of Precession, and show its relation to the Tropical year.

IV. Define the Sidereal, Anomalistic, and Civil years.

V. Show the relation of Aberration to the velocity of light, and to the Earth's orbital motion.

VI. Explain the method of computing the distance of an Inferior Planet by means of its greatest Elongation.

VII. Given the altitude of the Pole Star, to find the latitude of the place.

VIII. Compute the Longitude, Right Ascension and Declination of the Sun, any one of those quantities and the obliquity of the Ecliptic being given.

IX. Given the meridian altitude and Declination of a heavenly body, to find the latitude of the place.

X. Find the time by a single altitude of the Sun, and deduce therefrom the longitude of the place, by the chronometer.

XI. Deduce the value of the Lunar ecliptic limits, and show when an eclipse of the moon is impossible and when inevitable.

XII. Give Kepler's third law, and show the application thereof to the finding of the Sun's horizontal Parallax, by observing the transit of Venus.

IX. RHETORIC, ORATORY AND GENERAL LITERATURE—PROFESSOR SHACKFORD.

I. ENGLISH COMPOSITION.

FIRST YEAR, FIRST TERM.

1. How can an element of a sentence be expanded? Give an example.
2. What is meant by the Unity of a sentence?
3. What faults of construction detract from Strength of expression?
4. State what Rhetorical principles are violated in the following sentences:

(*a*) "When I attempt to make a nearer acquaintance through the medium of Danish, they are shy and shrinking to such an extent that they do not attempt to conceal it."

(*b*) His dormant affections quickly awakened to fasten themselves pertinaciously around the timely object. His thoughts began industriously to shape out for himself a new future, which should embrace, as a setting, its appropriate jewel, a brilliant and prosperous career for this young hope of his house.

(*c*) What Skimpole wished to appear, La Fontaine was; a self-unconscious humbug, the one; simple and without guise, the latter.

(*d*) She has lectured one hundred nights, traveled several thousand miles, and written a book on Ethics, and all within a year—which is doing well, if she is a woman.

(*e*) I never failed in a solitary case to far exceed the hopes of my class.

(*f*) It is well calculated to develop those rational faculties, which, in the old system, were left to develop themselves.

5. How is Simplicity a relative quality in the choice of words?

6. Construct a Periodic, and change it into a Loose, sentence.

7. Mention some of the ways of varying a sentence.

8. When are ***on the contrary, on the other hand, conversely, obversely,*** used as links between sentences?

9. Mention some of the methods of building up a paragraph.

10. Consider in detail the following paragraph in regard (*a*) to the construction of the several sentences; (*b*) to the choice of words; (*c*) to its conformity to the rules of the Paragraph:

(1) "The attempt has utterly failed, even when made under the most favorable conditions for success. (2) For instance, the French Academy, containing the great body of the distinguished literary men of France, once sought to exercise such a domination over their own language, and, if any could have succeeded, might have hoped to do so. (3) But the language recked of their decrees, as little as the advancing ocean did of those of Canute. (4) They were obliged to give way, and in each successive edition of their dictionary, to throw open its doors to words which had established themselves in the language, and would hold their ground, comparatively indifferent whether they received their seal of allowance or not."

2. ENGLISH COMPOSITION.

SECOND TERM.

I.

1. From what does Antithesis derive its force?

2. What is necessary to make a resemblance a Figure of Speech?

3. What conditions must be satisfied when a Figure of Similarity is employed to aid the understanding?

4. Exemplify the difference between the Antithesis and the Epigram.

5. State the chief means of attaining Brevity.

6. What principles of Arrangement aid the understanding of a complex statement?

7. What are the conditions in the employment of language to excite Pathetic emotion?

8. Explain what is meant by the permanent, and the variable element in Taste.

II.

9. From what does the Simile derive its force?

10. Mention forms of Antithesis in which the contrast is of a secondary kind.

11. State the nature and object of Fictitious Examples.

12. Explain the nature and effect of Innuendo.
13. How does Variety contribute to Strength?
14. Why do many scenes and works of Art please after frequent repetition?
15. How is the effect of Ludicrous degradation softened?
16. In what ways is language made to produce æsthetic effects?

III.

17. From what does Metonymy derive its force?
18. What conditions are necessary to render Metaphor a source of pleasure?
19. State the nature and limits of the Hyperbole.
20. What is the Identical assertion? Seeming Irrelevance? Extreme case?
21. State the three kinds of violation of Brevity.
22. Mention the conditions essential to Sublimity.
23. What are the elements that enter into Wit?
24. What are the conditions of Melody in the construction of clauses and sentences?

3. HISTORY AND ELEMENTS OF THE ENGLISH LANGUAGE.

FRESHMAN YEAR, THIRD TERM.

1. State briefly the foreign influences that have operated in the growth and development of English.
2. What Scandinavian peculiarities are found in English etymology and syntax?
3. What has brought about the dropping of inflections?
4. Indicate the character of the changes that have taken place since the 14th century.
5. What division into Periods is generally made?
6. What are the terminations of nouns that have come from the French?
7. Whence do we get the words *geology, seraphim, algebra, orrery, reynard, parchment, magnet, imp, snow, second, three, uncle, domestic, stentorian, amen?*
8. Give the reason in each case for calling the following words Anglo-Saxon: *good, go, old, quicken, knock, father, goose, sun, buzz, three, fourth.*
9. Why is an Anglo-Saxon style strong and picturesque?
10. Name some words where the noun is Anglo-Saxon and the adjective of foreign origin.
11. Explain *free-mason, beef-eater, grocer, brand-new, island, shame-faced, Charles' wain, twilight.*
12. What are the two great Landmarks of the Semi-Saxon period?
13. What is the explanation of synonymous words often used in pairs?

14. Explain the following forms: *did, its, mine, here, once, him, whom, whilom, be* and *gain* as prefixes.
15. Give the force of the adjective suffixes, *y, en, ly, ed, ish, ern, ive.*
16. What is the relation between consonants in English and in German?
17. State the three ways of expressing the relation between the parts of a compound, with an example of each way.
18. Trace the origin of several particles.
19. State some of the causes of the anomalies in English orthography.
20. What are the peculiar characteristics of the verb?
21. Give the principal formatives of the verb, and their force.
22. To what can the substantive verb be traced back in all languages? Why called substantive?
23. Explain the auxiliaries *may, can, shall, will, should, would, could, do.*
24. How does a foreign word become naturalized?
25. What principle operates in causing the change commented upon in the following words: "As the pupils grow older, they do not care to read about a fair lady, but they are at once drawn to a female possessing considerable personal attractions. A brawl is a word good enough for a scuffle between peasants; but between aldermen the brawl becomes a fracas. An emeute is a far genteeler word than a riot. A farmer prides himself upon being an agriculturist."
26. Make a list of the Anglo-Saxon words, and of those of French origin in the preceding quotation.
27. Make a list of the symbolic and the presentive words.
28. Indicate the terminations for causative, intensive, frequentative, and inceptive verbs.
29. What are the three kinds of syntax?
30. State the principal heads under which changes in words may be classified, with an example of each class.

4. RHETORIC.

FOURTH YEAR, FIRST TERM.

1. The Division of Arguments.
2. The Sign.
3. Concurrent Testimony.
4. The "Idola" of Bacon.
5. The Progressive argument.
6. Analogy.
7. Inductive and Syllogistic Reasoning.
8. The Burden of Proof.
9. The Rebutting of Presumption.
10. Invented Examples as Argument and as Ornament.

11. Direct and Indirect Refutation.
12. The Use of certain Ambiguous Words, with three examples.
13. The Statement of Objections.
14. The different kinds of Introduction, with examples.
15. The Peroration.
16. The Address to the Feelings, and to the Understanding.
17. Indirect Description.
18. Perspicuity in the Construction of Sentences.
19. Energy as effected by the use of Tropes.
20. The Suggestive Style.

5. ANCIENT ORATORY.

SENIOR YEAR.—SECOND TERM.

1. What was the function of the orator at Athens?
2. What were the divisions of ancient oratory?
3. What limitations in the modern use of the word oratory?
4. Whence are oratorical rules derived?
5. What circumstances gave to Athenian oratory its peculiar development?
6. What are the leading points of difference between that period and our time?
7. What is the connection between oratory and democracy?
8. Give an account of the first political orator at Athens.
9. The character, style, and influence of Georgias.
10. Who were the prominent sophists? What was their relation to Grecian culture?
11. By whom was "The lives of the ten orators" probably written?
12. What were the peculiarities of the style of Lysias?
13. State the peculiar features in the life, character and position of Socrates?
14. Plato's view of Rhetoric in the Georgias, and in the Phædrus.
15. His view of the essential opposition of the philosophical to the political life.
16. What were the characteristics of Demosthenes' style?
17. Who were the leaders of the Macedonian and the Anti-Macedonian party?
18. Compare Demosthenes and Cicero.
19. State what were the characteristics of the decline of eloquence.
20. Name the different periods of Roman eloquence after the Italian period.

6. COMPARATIVE LITERATURE.—FOURTH YEAR.—THIRD TERM.

[*Ten topics assigned to each student.*]

1. In what respect is all criticism comparative?
2. What is "disinterestedness" in criticism?
3. Give a definition of literature.
4. How does Hegel classify the different kinds of poetry?
5. What is meant by Aristotle's aphorism, "Poetry is truer than history?"
6. In what do present methods of literary criticism differ from past?
7. What is Sainte Beuve's idea of a classic writer?
8. Give a concise statement of Romanticism and Classicism in literature.
9. What gives a work a place in Universal literature?
10. Why is the Fable one of the earliest forms of literature?
11. State the characteristic features of La Fontaine, and the points of difference between his fables, those of Æsop, and those of India.
12. How far is poetry an "imitative" art, and what are the limitations to the term?
13. Illustrate, by epic, elegiac and iambic verse the necessity and æsthetic value of rhythmic expression.
14. What is peculiar to Hebrew poetry?
15. State the theories concerning the Homeric epopee.
16. In what does epic unity consist? lyric? dramatic?
17. Mention the great national epics, and the features which they have in common.
18. What is meant by epic "machinery," and how can the term be applied to Homer and Virgil?
19. Give De Quincey's view of an Achilleis.
20. How does the Nibelungenlied illustrate the formation and growth of the national epic?
21. State your idea of Tennyson's Idyls of the King as an epic.
22. Show some of the characteristic differences between the drama of Æschylus, Sophocles, Euripides and Shakespeare.
23. Give a brief account of the "Prometheus," "Antigone," and "Medea."
24. Mention the leading characteristics of the comedy of Aristophanes.
25. State and criticise Taine's estimate of Milton.
26. What was the origin and function of the Greek chorus?
27. When did History first take its place as a distinct form of literature in Greece?
28. What are Aristotle's reasons for assigning to the drama a higher place than to the epopee?
29 State the characteristic features of Roman literature.

30. What is the chief distinction between the French and English drama at the period of highest development, and what is the leading cause of that difference?

X. MILITARY SCIENCE.

TACTICS, FIELD FORTIFICATION, ETC.—LT. VAN NESS.

1. Give the commands and explain how a battalion in column of fours may be rapidly thrown to the front in line of battle.
2. By what commands and movements may a battalion in double column be deployed to the right or left into line of battle?
3. What are the functions of each of the three arms of the service: infantry, cavalry and artillery?
4. Explain the composition and duties of the advance guard of an army in the field.
5. State the object of outposts, and how they are disposed.
6. Draw a plan of a bastioned fort, and describe the mode of constructing such a work of earth.
7. Explain the manner of constructing bomb-proof shelters and powder magazines.
8. Describe the three kinds of cannon now in use, and the projectiles which pertain to each.
9. Describe the time, concussion, and percussion fuzes.
10. Describe the Bormann time-fuze.

III. TECHNICAL COURSES.

The studies of the first two years of each of the Technical Courses are to a large extent the same as those of the first two years in the course in science. Hence, the examination papers that follow relate to studies of the third and fourth years of the respective courses.

I. AGRICULTURE.

[*Besides the papers given below, all those on Botany and Economic entomology in the special department of Natural History are included in the course in Agriculture also.*]

I. AGRICULTURAL CHEMISTRY—PROFESSOR CALDWELL.

I. JUNIOR YEAR—FIRST TERM.

1. What is meant by the terms "specific gravity" and "specific heat?" How are the specific heat and specific gravity of a body determined?
2. Illustrate by examples and explain the absorptive power of solids for gases.

3. Describe and explain the phenomenon o. osmose.

4. What relations do heat and electricity bear to chemical change?

5. Name the elements that compose most of the known mass of the earth in the order of the abundance of their occurrence.

6. Five pounds of nitric acid and eight pounds of ammonia may be conveyed to the soil of an acre in the annual rainfall. How much would it cost to supply an equal quantity of nitrogen in the form of ammonic sulphate, containing 90 per cent. of pure salt, and costing six cents per pound?

7. What are the chemical changes that accompany the germination of seeds?

8. What changes in the condition of the surrounding atmosphere are produced by growing plants?

9. What are the relations between fermentation, putrefaction and life?

10. What are the proofs that soil is derived from the rocks?

11. Describe the main features of water-culture experimentation.

12. How would you proceed to investigate the function of an ash ingredient of a plant?

13. In what form must the sulphur required by the plant be supplied in its food?

14. Discuss the occurrence, necessity and function of sodium, with respect to vegetable growth.

15. Describe the principal steps in a quantitative gravimetrical analysis.

II. JUNIOR YEAR—SECOND TERM.

1. Why does a soil rich in humus absorb more oxygen than one poor in humus?

2. What interesting result is produced when a solution of an ammonium salt is passed through a portion of soil, and how can it be proved that the phenomenon is not a case of mere displacement of the solution already in the soil?

3. Explain the chemistry of the action of zoolites as absorbents of plant food.

4. How is it proved that zoolites are present in an arable soil?

5. Is or is not any part of the absorbent power of the soil attributable nearly to its porosity, and upon what experiments do you base your answer?

6. What oxide takes special part in the absorptive power of the soil for phosphoric acid?

7. Are nitrates absorbed by the soil? Give the reason for your answer.

8. If the soil of an acre one foot deep weighs about 3,000,000 pounds, and a fair dressing of guano, containing 10 per cent. of nitrogen, is 300 pounds; what bearing have these facts in illustration of the practical value of a soil analysis?

9. What are the chemical properties of humus?

10. What is the evidence that shows that plants do not get their carbon from the humus of the soil in which they grow?

11. What is the relation between the amount of combined nitrogen conveyed to the soil in the atmospheric precipitations, and the amount required by the crops?

12. How does the agricultural value of a lime yielded by dolomite compare with that yielded by limestone? Give the reason for your answer.

14. What part may lime play in a soil containing much nitrogen in the form of organic remains?

15. Explain the chemistry of the conversion of insoluble into soluble phosphate.

16. About what proportion of its manurial value does fodder lose in its conversion into manure by the animal?

2. VETERINARY MEDICINE AND SURGERY—PROFESSOR LAW.

I. VETERINARY ANATOMY AND PHYSIOLOGY.

1. Describe the shoulder joint in the horse stating particularly the various means by which the bones are retained in apposition.

2. What is the principal thoracic muscle engaged in quiet respiration? State its mode of action and whence it derives its nerves?

3. What muscles coöperate to open the glottis? What is the difference (as regards their origin) of the motor nerves of these muscles on the right side and the left?

4. State what you know of the changes in the air and blood effected in respiration:—of the quantity of air taken in at each inspiration in the horse:—of the amount of deterioration effected by each successive inspiration of the same air;—and the stage at which re-breathed air becomes uninspirable.

5. How would you treat asphyxia in the newborn and adult?

6. What would be the effect of closure of the nostrils in the horse and why?

7. Describe the position and extent of the frontal sinus in the horse and ox.

8. Describe the parotid gland:—its structure, its position, and the course of its duct;—and state the main uses of saliva.

9. Mention what you know of the functions of the liver and the uses of bile.

10. In which of the domestic animals are the intestines the longest and in which the most capacious? What relation does length of intestine bear to the nature of the food and the size of the stomach?

11. State the main differences, in composition and chemical reaction, of the urine of carnivora and herbivora, together with the causes.

12. What causes the sigmoid curve in the penis of the bull? State its pathogenic influence in cases of urinary calculi.

13. Describe the membranes of the fœtus in the later months of gestation, and state the uses of the water bags during pregnancy and parturition.

14. State the leading principles to be considered in seeking to improve animals by breeding.

15. Describe the mode of union of the pedal bone and the hoof wall in the horse.

II. VETERINARY MEDICINE AND SURGERY.

FIRST TERM.

1. What are the general symptoms and phenomena of fever?

2. What special features distinguish cancers from simple tumors?

3. How would you proceed to disinfect a wooden building, containing straw or hay, the building having been occupied by the victims of lung fever?

4. Enumerate the more serious contagious fevers of cattle?

5. In what respects do the malignant carbuncular afflictions differ from the specific contagious fevers? State the general causes and the characteristic lesions in the blood and tissues in the first.

6. State the symptoms and course of the intestinal fever of swine (hog-cholera).

7. Mention the climatic conditions necessary to the maintenance of Texan furr in cattle.

8. Enumerate the common gastric and intestinal parasites of the horse. State the portions of the alimentary canal in which they are respectively found and whether they infest other organs or what.

9. What parasites cause urinous bronchitis in horse, ass, ox, sheep and swine respectively? What are the symptoms of their presence, and the treatment demanded?

10. What different features and habits in the mange producing acari lead to the varying inveteracy of the existing disease?

11. What are the best general parasiticides for parasites living on the skin?

12. What causes tinea tousurans in animals? State the symptoms and treatment.

13. State the causes, symptons and treatment, of goitre in the domestic animals.

14. What conditions give rise to *roaring* in horses?

15. How would you distinguish laryngitis and pharyngitis in the horse?

16. State the distinctive symptoms of ***nasal gleet, pus in the nasal sinuses, nasal discharge from diseased teeth, and collections of pus in the guttural pouches.***

III. SECOND TERM.

1. State the common causes of *facial paralysis* in the horse, with the symptoms and treatment.
2. State the symptoms of *amaurosis*, the usual lesions, what cases are curable and what incurable, and the treatment in the different cases.
3. State the symptoms and lesions of *cataract* and what treatment is desirable.
4. A horse has chronic fœtid discharge from the nose, falls off in condition, has occasional slight colicky pains, and drops portions of his food half chewed; what is probably amiss and how can it be remedied?
5. How would you distinguish *inguinal hernia, hydrocele, sarcocele?* What treatment would you advise in each?
6. State the common causes of acute and chronic tympany in oxen, and what can be done to relieve.
7. Give the causes and symptoms of gastric tympany in the horse, and state how it differs in gravity from that of oxen.
8. What functions are fulfilled by the liver in addition to the secretion of bile? What diseased conditions may be brought about by impairment or suspension of these functions?
9. What species of worms is most commonly found in the blood-vessels of the horse? What symptoms arise from their presence in the anterior mesenteric artery and its divisions? What can be done to relieve?
10. State the symptoms of ordinary and capillary bronchitis, and how they can be respectively distinguished from those of worms in the lower air passages, pneumonia and pleurisy? Furnish general principles for treatment.
11. How does the hepatized lung of ox and pig differ from that of the horse or dog?
12. State the general causes and results of periostitis in metacarpal and digital bones, also the treatment in the different stages.
13. Describe the peculiarities of gait characteristic of lameness in shoulder, elbow and foot respectively, and give an explanation founded on anatomical and physiological data.
14. Describe the various conditions causing *knee sprung*, or starting forward at the carpus.
15. Mention the various structural lesions and functional disorders which may cause lameness in the shoulder.
16. Enumerate the disorders which are especially dependent on damp undrained land.

3. APPLIED AGRICULTURE.—PROFESSOR ROBERTS.

I. SENIOR YEAR—FIRST TERM.

1. State how air, water, heat, and light influence the fertility of the soil and the growth of plants.

2. Explain how formed, classify, and give the leading characteristics of soils; also note their adaptation to the growth of grain and grasses.

3. State what climate and soil is best adapted to the growth of cereals.

4. What to clover and the various root crops.

5. How much change in altitude gives a change of one degree in temperature? In this connection give the reason for frost appearing in the lowlands before it does on the adjoining hillsides.

6. State the subjects to be taken into consideration in the selection of a farm placing them in the order of their relative importance.

7. Fields—how laid out.

8. Fences—manner of construction and material used.

9. Plans for construction, and materials for farm buildings.

10. Farm yards and water privileges.

11. Farm house surroundings.

12. Farm accounts—how kept.

13. What are the objects sought by general tillage? How may we best accomplish them?

14. State the benefits arising from the mechanical division of the soil, and explain how we may often accomplish the same result by utilizing the forces of nature.

15. Give in brief the method of the preparation of the soil, planting, harvesting, and marketing of cereals: also, kind, quality, and mode of application of fertilizers.

16. Give in brief the manner of manufacturing, preserving and applying farm yard manure.

17. Give those elements which are most liable to become exhausted from severe cropping.

18. Give the reasons for rotation of crops, and state the amount of Ammonia, Phosphoric acid and Potash that is removed from an acre by a single crop of wheat of twenty five bushels per acre, allowing the straw to weigh three hundred pounds.

II. SENIOR YEAR—SECOND TERM.

1. Give the history and characteristics of Short-horns.

2. Holsteins.

3. Ayrshires.

4. Jerseys.

5. Explain the laws of transmission or likeness.

6. Of variation.

7. State when a prepotent animal is valuable and when not.

8. Draw a circular diagram of the pedigree of the short-horn bull St. Valentine, tracing it through all its branches, and down to the first volume of the English herd-book, and give the per cent. of alloy blood, if any.

9. Give a synopsis of the history of the four leading breeds of swine.

10. State the leading characteristics of each breed and its adaptation to locality and circumstances.

11. Give the reasons why young animals will gain more pounds gross in proportion to the food consumed than old ones.

12. Give the history and comparative value with reference to nearness or remoteness from large cities and cheap lands, of the following breeds of sheep:

13. Spanish Merinos.

14. Southdowns, or Mutton Sheep.

15. Combing, or Long-wooled Sheep.

16. Give the summer and winter management of Sheep and Lambs.

17. Time of shearing, mode of handling, and marketing the wool.

III. SENIOR YEAR—THIRD TERM.

1. What are the injurious effects arising from surplus stagnant water in the soil?

2. Distinguish between moistness and wetness of soils, and illustrate by diagrams.

3. What are the effects produced on soil, climate, and plants by thorough drainage.

4. Explain the Elkington system by diagram and state when it can be advantageously applied.

5. Measure, lay out, and map for thorough drainage, the east field on the farm.

6. Give specifications and estimates for the same, locate silt basins, also give size and kind of tile.

7. Give the method of the preparation of the soil, planting, and cultivation of Indian corn. Explain by diagram and give reasons for the same.

8. Describe the mode of raising roots by both flat and ridge culture, and give their value as food for animals, as compared with English hay.

9. Give in brief the history of the thorough-bred horse.

10. Enumerate and describe the leading breeds of draught horses.

11. Sketch "Goldsmith Maid." Note and number on the margin the exterior points.

12. Compare each of these with the points in the draught horse, and state wherein the mechanical proportion and general conformation may, and should differ.

13. Give the most approved methods of educating and training a young horse.

14. Illustrate with a horse on the campus the manner of subduing those that are vicious and wild.

15. Give stable management for road and farm horses.

16. Give the common and scientific name of each of the various forage plants.

17. Give their comparative value as food for domestic animals.
18. State how and when they should be cut and cured.
19. Collect and name ten species of weeds and state the best methods of eradication.
20. Name the parts in the Reaper and Mower that are most liable to get out of repair.
21. Point out those parts where the greatest loss of power is sustained from concussion, and the remedies for the same.
22. Illustrate by diagram, the principles and attachments of a horse hay fork and conveyor.

4. HORTICULTURE—PROFESSOR PRENTISS.

1. Name the so-called small fruits.
2. Give the botanical name of each, and state the Natural Order to which it belongs.
3. Write out a brief treatise on the cultivation of the small fruit you regard as most valuable.
4. Propose a plan for a fruit garden of two acres which shall admit of the highest degree of economy in its thorough cultivation.
5. Give a classification of the diseases of plants.
6. Give a description of those which are most injurious to fruits.
7. Mention the diseases of all our drupaceous fruits, and state the most approved remedies.
8. Give your opinion as to the relationship of forest growth to climate.
9. Define landscape gardening, and name the different styles and schools.
10. Characterize the different styles.

II. ARCHITECTURE—PROFESSOR BABCOCK.

1. EXAMINATION IN BUILDING MATERIALS AND CONSTRUCTION.

1. Name the stones commonly used in building, and classify them geologically.
2. What is lime?
   " " hydraulic lime?
   " " cement?
   " " Portland cement?
   " " plaster Paris?
   " " selenitic mortar?
3. Explain the proper method of making concrete, and give the formula for the ingredients.
4. Name the kinds of wood commonly used in building.
5. Name the different methods of dressing stone.
6. Name and sketch three kinds of facing work in stone walls.

7. Show by sketches the English bond, the Flemish bond, and the common bond.
8. Name the best methods of seasoning timber.
9. What is dry-rot? and how can it be prevented?
10. What metals are commonly used in building?
11. Name and sketch the common forms of arches.
12. Of what is glass made; and what are the ordinary kinds?
13. Define the following terms: Stylobate. Pediment. Battlement. Architrave. Skew-back. Pillar. Pilaster.
14. Name the parts of an entablature.
15. Sketch a king-post truss.
" " queen " "
" " hammer beam truss.
" " collar " "
" " Howe "
16. Name the essential parts of the construction and finish of a wooden stair-case.
17. What materials are used for the outer covering of roofs?
18. Why is sand mixed with the lime in making mortar?
19. What is a compound pier?
20. What metals are bases of the paints in common use?

2. EXAMINATION IN MECHANICS.

1. Define Mechanics; name its subdivisions; and state to which one of them our discussion has been limited.
2. What is a *structure?*
" " " *machine?*
3. What is *force?*
" " *equilibrium?*
4. Define stiffness.
" strength.
" toughness.
5. Define Resolution of forces, and composition of forces, and illustrate by the parallelogram and polygon.
6. What is the *moment* of a body?
7. Sketch a queen-post truss, with braces; name each piece; and state which are ties, and which are struts.
8. State the methods of analyzing a king-post truss graphically.
9. What is the deflection of an oak beam, 20 ft. long, 8x12, carrying a load of 1,000 lbs. at the middle point?
10. Explain the method of finding the centre of gravity of a quadrilateral.
11. Explain the method, and give the formula, for finding the centre of gravity of a figure which is the difference of two figures.
12. What are the four ordinary modes of rupture in an arch?
13. Explain the method of determining the horizontal thrust at the crown of an arch.
14. Explain the method of determining the direction and value of the thrust at the foot of a rafter.

15. How is the position of the neutral axis in a beam determined?
16. What is the ratio of a load at the middle point of a beam to an evenly distributed load which will produce the same deflection?
17. Explain the method of determining the line of resistance in a pier.
18. Explain the method of determining the line of resistance in an arch.
19. To what forces is a loaded beam subjected, and in what part of the beam does each of them act?
20. Explain the principle of the lever, and the method of determining the common centre of gravity of two weights.

3. ARCHITECTURE.

WINTER AND SPRING TERMS.

1. Make a sketch showing the general arrangements of a Christian Basilica, and name the various parts of such a building when fully developed.
2. What is the characteristic feature of the Basilican style? of the Byzantine? of the Lombard? of the Italian Romanesque?
3. Define the following terms: Triforium. Narthex. Campanile. Pendentive. Baptistery. Baldacchino.
4. Name the subdivisions of Romanesque Architecture.
5. Name the two best examples of Byzantine Architecture, and give their dates.
6. Explain the general treatment of the bell of a capital in the Romanesque styles, and sketch the typical forms.
7. What methods of decorating the interior surfaces were in use during the Byzantine period?
8. Name the style to which each of the following buildings belong: The Cathedral at Worms. St. Nicholas, Bari. Santa Fosca, Torcello. Cathedral at Pisa. San Miniato, Florence. San Ambrogio, Milan. Cathedral at Spires. Notre Dame, Clermont. Cathedral at Rheims. Cathedral at Canterbury. St. George, Bocherville. Tower of Earl's Barton.
9. What are the subdivisions of Gothic Architecture?
10. Sketch a plan of a fully developed Rib-Vault, and name the parts.
11. Sketch and name the typical forms of the vaulting used in the later English Gothic buildings.
12. Sketch the sections of the different kinds of Bowtells.
13. Sketch a plan of a Romanesque compound pier, and the arch supported by it.
14. Explain, and show by sketches, the difference between plate-tracery and bar-tracery.
15. Explain and sketch the methods of effecting the transition from the square tower to the octagon spire.

16. For what purpose was the pointed arch first systematically used?

17. Show by a sketch the construction of a sexpartite vault.

18. Give the dates of the three periods of English Gothic Architecture.

19. Why was the flying buttress introduced?

20. Which is the best Gothic Cathedral in France? Which is the best Gothic Cathedral in England? Which is the best Gothic Cathedral in Germany?

III. CHEMISTRY AND PHYSICS.

CHEMISTRY—PROFESSOR CALDWELL.

1. QUALITATIVE ANALYSIS.

SECOND YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used, to prove, both the presence of these elements, and the absence of all others: if possible, write the equations representing the final reactions by which you prove the presence of each of the elements mentioned.

1. As_2O_3, $SnCl_2$, $Pb(C_2H_3O_2)_2$, $Bi(NO_3)_3$, NH_4Cl, KCy.
2. K_4FeCy_6, HNa_2PO_4, $(NH_4)_2C_2O_4$, $Na_2B_4O_7$.
3. $Pb(C_2H_3O_2)_2$, $AgNO_3$, $HgCl_2$, Na_2SO_3, $(NH_4)_2C_2O_4$, Na_2SO_4.
4. $FeSO_4$, FeS, Cr_2O_3, Al_2O_3, $CuSO_4$, Hg_2Cl_2, $SnCl_2$.

2. QUANTITATIVE ANALYSIS.

THIRD YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the quantitative analysis of a substance contâining the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used.

1. Cupric sulphate, (the copper being precipitated as hydride).
2. Brass.
3. Rochelle salt (estimation of potassium and sodium).
4. Ferric phosphate.
5. Type metal.

3. CHEMICAL PHILOSOPHY.

THIRD YEAR, FIRST TERM.

1. What weight of Hydrogen is required to raise a weight of

5000 gms., and what would be its volume at —17° C. and 255 mm. barometric pressure.

2. How much iron would be required to produce that amount of Hydrogen. $Fe + H_2SO_4 + aq = FeSO_4 + aq + H_2$.

3. Define molecule. What is a simple, and what a compound molecule? Give examples.

4. What is meant by atomic and what by molecular weight? Show how the laws of definite and multiple proportion are in accordance with the atomic theory.

5. How may we distinguish between a mixture and a chemical compound?

6. What relation does the molecular weight bear to the sp. gr. of the molecule in the gaseous state?

7. What is the weight in criths of one liter of HCl?

8. The specific heat of a metal is .03244. It forms a compound with Chlorine containing 34.8 per cent. of Cl. What is the atomic weight of the metal and what is its quantivalence?

9. Molecular weight of potassic chlorate is 122.6, and 2.95 grs. contain 1.155 grs. of oxygen. Required the total atomic weight of oxygen, and the number of oxygen atoms in the molecule.

10. Analysis of a substance gives the following results:—C 26.57; H, 2.74; O, 71.11. Required the simplest formula, and the percentage composition calculated from that formula.

11. Explain variations in equivalence. What is the law that governs this variable power? Give examples.

12. What are condensed types? Give examples.

13. What are fat acids? In forming fat acids from alcohols, how are the positive radicals changed to negative ones?

14. Give the general formula for mixed ethers.

15. What is the rule for the termination of the positive radical, in the nomenclature of ternary compounds of the water type?

16. In case of variation of quantivalence in the negative radical, what are the terminations and prefixes used in the nomenclature of ternary compounds of the water type?

17. To what class does the compound represented by each of the following symbols belong:

$$\begin{array}{l} CH_3 \\ \;\; H \;\; N \\ \;\; H \end{array} \qquad \begin{array}{l} C_2H_5 \\ C_2H_5 \; N \\ \;\; H \end{array} \qquad \begin{array}{l} C_2H_4 \\ \;\; H_2 \; N_2 \\ \;\; H_2 \end{array} \qquad \begin{array}{l} C_2O_2 \\ \;\; H_2 \; N_2 \\ \;\; H_2 \end{array} \qquad \begin{array}{l} K \\ Cl \; N \\ H \end{array}$$

18. Express by graphic symbols the construction of the following:

$$\begin{array}{l} C_2H_4 \\ \;\; H_2 \; N_2 \\ \;\; H_2 \end{array}$$

3. THIRD YEAR, SECOND TERM.

1. Name the halogen elements in the order of their electrochemical character; give the atomic weight of each one, and its general characteristics and principal compounds.

2. Name the elements of the Nitrogen group, give their properties and compare the hydrides.

3. Define an amine; give an example of a secondary diamine; define a monamide, a phosphine, stibine and arsine.

4. Write graphically the formulas of all the oxides and acids of phosphorus, and explain the peculiarity in the structure of phosphorus and hypo-phosphorus acids.

5. Write graphically the formulas of the oxides and acids of sulphur, and give the equations representing the manufacture of sulphuric acid from sulphur.

6. Name the alkaline metals with their group properties, and write the reactions representing the manufacture of sodium carbonate from sodium chloride; give the mode of preparing sodium hydrate.

7. 91.462 gms. of silver yielded 121.499. gms of silver chloride; calculate the atomic weight of chlorine, that of silver being 108.

8. Describe the metals of the alkaline earths, and their principal compounds; how do the hydrates and carbonates differ from those of the alkaline metals in respect to their behavior when heated?

9. Name the useful ores of iron, and describe the process of making wrought iron from the ore; how do wrought iron, cast iron and steel differ in composition?

10. What are the points of similarity between the compounds of manganese, iron, aluminum and chromuim? Write the formulas of the oxides, chlorides and alums of these elements.

11. What volume of oxygen is required to burn one litre of hydrogen sulphide, and what is the volume of the gaseous products?

IV. CIVIL ENGINEERING—PROFESSOR FUERTES.

[*Each student in this Department on entering the examination room, draws by lot a numbered card containing the subjects he is expected to discuss.*]

I. MECHANICS.

[*Papers which give only the general heading of a subject indicate that the student is expected to write, as fully as he may be able, upon the theory of the subject and also to develop and discuss the mathematical analysis.*]

I.

12. Demonstrate several methods for finding the resultant of a system of forces in space.

16. Centres of gravity.

20. Develop and discuss the formula for dynamical stability.

II.

1. (*a*) Couples. (*b*) Centrifugal force. (*c*) Centre of percussion.

III.

1. Strength of shearing: (*a*) Working load. (*b*) Rupture by shearing.

6. Action of shearing force in the plane of rupture. Value of the shearing force.

11. (*a*) Modulus of proof strength for shearing. (*b*) Power that may develop the shearing stress to the limit of proof strength for elliptical, cylindrical and tubular girders.

IV.

1. Elongation of a prismatic body in terms of the elongating force: Modulus of elasticity. The force corresponding to the elongation.

(*a*) UNIFORMLY LOADED GIRDERS.

I. *Free at one end.*—Find the tangential angle, and the ordinate giving the deflection for any point of the curve. The deflection for the middle point of the girder. The work done in producing the deflection. The deflection for a terminal load in addition to the uniform load.

II. *Girder supported at both ends.*—Find the total deflection. Prove that for a uniform load, the depression is ⅝ of that produced by a local central load.

$$\text{Data: } Q = ql \qquad \delta_1 = \frac{Ps^2}{n^2 WE}$$

(*b*) HOLLOW AND WEBBED GIRDERS.

Find the measure of the moment of flexure of the following: A tubular girder. A single webbed girder with double flanges. A crucial girder. A T girder. Prove that for the same quantity of material the high webbed and flanged girder gives the greatest moment of flexure. In the case of a beam twice as deep as it is broad, find the moment of flexure when the direction of the force is parallel to the depth of the beam, and compare it with that when the deflecting force is normal to it.

(*c*) MOMENTS OF PROOF LOAD.

Prove that the moment of proof load for parallelopipedical beams increases with the width and the square of the height, while the proof load varies inversely as the length.

Also that in bodies of equal weights, masses or cross-sections, the proof loads are proportions to their heights. And that when a square beam is placed with its diagonal in the plane of the deflecting force, its proof load is 0.707 of what it would be if it were laid on its side.

$$\text{Data: } Pl = \frac{WT}{E} \qquad W = \frac{bh^2}{12} = \frac{\pi a^2 b}{4} = \frac{\pi r^4}{4} \text{ \&c.}$$

(*d*) GIRDER FIXED AT ONE END AND LOADED BY TWO PARALLEL FORCES.

Find the moments of flexure. Discuss the maxima and minima values of these moments for all positive and negative values of the pressures, and locate the points of inflection of the elastic curve.

$$\text{Data}: r = \frac{WE}{m} = \frac{WE}{Px}$$

No. 6.

Find the most general equation of the elastic curve, or

$$y = \frac{Pl^3}{3WE}$$

$$\text{Data}: r = \frac{WE}{Pa} \qquad r = \frac{(dx^2+dy^2)^{\frac{3}{2}}}{d^2y dx} = \frac{1}{\frac{d^2y}{dx^2}} \text{ nearly.}$$

Take the origin at the loaded end of a beam, fixed at one and free at the other. If you prefer Weisbach's method, take

$$WE = Pxr \qquad ds = \sqrt{1+(\tan a)^2}dx \qquad r = -\frac{ds^3}{dx^2.d(\tan a)}$$

$$\tan a = \frac{P(b^2 - x^2)}{2WE}$$

(*e*) MOMENT OF FLEXURE.

Prove that in rectangular beams, the neutral axis passes, theoretically, through the centre of gravity of the cross-section; and find the bending moment for a parallelopipedical beam, imbedded at one end and loaded at the other. Find also the radius of curvature of the neutral surface.

(*f*) FRICTION.

Find the force required to draw a body up or down upon an inclined plane under any conditions of the direction of the force and of the motion.

(*g*) FRICTION.

Find the moment of friction of a cylinder resting on its right section; also when it rests on a cylindrical ring, and when on a conical pivot.

2. LAND SURVEYING—MR. CRANDALL.

1. Assume the following field notes and magnetic bearings:

* * * * * * * *

The magnetic variation is 7 degrees, 15 minutes West. Reduce the data to the true meridian, calculate the area by latitudes and departures, prepare the plotting sheet, and from the N. W. corner of the field draw two lines that will divide the plot into three equal areas.

3. HIGHER GEODESY—MR. CRANDALL.

1. Give a brief outline of the operations required in a trigonometrical survey.

4. Find the angle and side equations, and the probable error of the side *ce* in the following sketch:

* * * * * * * *

The angles of each triangle were observed separately, with the exception of *dea* and *acb*, which were not observed at all: or the side *ae* was observed in only one direction. The base line is *ad*.

5. Required: The data for locating the boundary line, (which is the 42d parallel of latitude) between New York and Pennsylvania.

6. Describe the method of plotting a chart of small extent by means of the Polyconic Projection tables.

7. Find the length of a degree of latitude in the latitude of Cornell.

4. RAILROAD SURVEYING—MR. CRANDALL.

1. Describe the adjustments of the Dumpy Level.

3. In order to locate a railroad two trial lines were run, giving the following field notes (see sketch):

* * * * * * * *

Find the equivalent straight and level length of each, and the more economical line for a given amount of traffic.

5. Required: the frog distance, middle and side ordinates of a turnout on the outside of a 5° curve for a No. 7 frog: length of switch rail twenty feet.

5. BRIDGE CONSTRUCTION—MR. CRANDALL.

1. Define the term factor of safety and give its usual values for iron railroad bridges.

2. Discuss the Howe truss.

4. In a simple truss (as per sketch) subjected to a uniform rolling load, and taking into account the weight of the truss itself, find: (*a*) the general equation for the horizontal strains under the constant load for any point in either chord. (*b*) The horizontal strains for the same points when the moving load covers only a portion of the truss. (*c*) The greatest horizontal strain. (*d*) Discuss the results.

7. In a triple truss (as per sketch) please find: (*a*) the horizon-

tal strains at panel points of upper and lower chords of trusses No. 1, No. 2, and No. 3. (*b*) The compression in triple truss at points of No. 1, No. 2, and No. 3. (*c*) The tensions at panel points of the simple trusses.

18. State the conditions of a post and tie, under which the inclination for a minimum of material may be obtained, discuss the results of the analysis and solve any example.

6 BAROMETRICAL LEVELING—PROFESSOR FUERTES.

After making a double and simultaneous set of observations, the following data were obtained, after correcting for errors of the instruments:

Barometer columns at lower station			= 29'.439
"	"	" upper "	= 29'.200
Attached thermometer at "		"	= 72°.08
"	"	" lower "	= 75°.91
Detached	"	" " "	= 75°.72
"	"	" upper "	= 72.33
Latitude			= 16°55'

Cistern on field, 6 feet above cistern at standard station. Elevation of sea level, 700 feet below cistern at standard station.

Find the elevation of the upper station above the sea.

7. ASTRONOMY.—PROFESSOR FUERTES.

1. Describe the sextant, the principle of its construction and its adjustments, including the adjustment for eccentricity.

13. Assume the following data:

Ithaca, N. Y., Dec. 7th, 1874.

Upper and lower limbs of the Sun, measured, in latitude, say, $42^\circ\ 27^m\ 30^s$ N, and longitude $1^m\ 40^s$ E of Washington. The mean time of observing the Sun's centre was $9^h\ 53^m\ 51^s\ 725$; and the double altitude corresponding to this time was $36^\circ\ 50^m$. The index error and all other sextant errors were $+2'\ 26''\ 25$. The chronometer keeps Albany mean time, and on the previous noon had been found $35^s\ 79$ slow. Find the rate of the chronometer, remembering that Albany is $11^m\ 32^s\ 87$ E of Ithaca.

14. Using as much as may be necessary from the above, find the latitude of Cornell, with the following additional data, taken on Dec. 5th, 1874.

Mean of the double altitudes of the Sun's centre, -	$43^\circ\ 27^m\ 30^s$
" " a. m. times, - - - - -	$10^\circ\ 29^m\ 9^s\ 09$
Index and other sextant errors, - - - - -	$+2^m\ 12^s\ 5$

8. HYDRAULICS.—PROFESSOR FUERTES.

7. Discuss the theory of efflux in accordance with Prof. Eddy's method.

8. Find the theoretical discharge through circular orifices in a thin plate.

19. Find the expressions for the head, diameter, velocity and delivery of long pipes, for all velocities, taking into account all resistances. Discuss the formulæ, the manner of applying them, and the precautions to be observed in designing a system of distributing pipes.

26. Describe the conditions of efflux when an abrupt contraction takes place in a conduit by the interposition of a diaphragm, find the loss of head and the law of the coefficient of resistance, and also the coefficients of resistance and contraction when the diaphragm is removed.

34. Sketch and describe a single and a double canal lock. Find the time required for filling and emptying both kinds of locks, and establish formulæ for the water consumption under circumstances of traffic that you may assume at your will.

22. In order to judge of the relative merit of several water meters, suppose that they are made to deliver water (under the same conditions of pressure and connections) through a short horizontal mouth-piece under 12 ft. of head. One of these meters is observed to deliver a turbid stream having a horizontal range of 9.8 ft., after falling through a height of 1.67 ft.; but at a vertical distance of 3.27 ft. below the outlet, the horizontal range is 4.90 ft. Required the coefficient of velocity due to the resistances offered by this meter.

37. Find the height of swell produced by a weir when it is and when it is not submerged or drowned.

38. Find the amplitude of backwater caused by a weir.

6. Given the fall, peripheral velocity and angle from the vertical at which an over-shot wheel takes water, find the radius of the wheel, the number of revolutions, width and number of buckets.

11. Find the effect of the impact, of the weight of the water, and of the centrifugal force, in an over-shot wheel.

STEREOTOMY.—PROFESSOR FUERTES.

1. The dimensions of an oblique segmental arch bridge are as follows:

*   *   *   *   *   *   *

Please calculate, by Buck's system, (*a*) the oblique span. (*b*) Obliquity. (*c*) Angle of the soffit. (*d*) Length of heading spiral. (*e*) Number of voussoirs, [about 1¼ feet thick] (*d*) Thickness of voussoirs. (*e*) Length of impost. (*f*) Actual divergence of courses. (*g*) Adjusted angle of soffit and axial length. (*h*) Angles of extrados and of twist. (*i*) Adjusted eccentricity. (*j*) Size of parallel rule, distance between winding sticks at intrados and extrados, and breadth of broad end of winding stick. (*k*) Triangular template for skew backs. (*l*) Describe the manner of constructing and using the templates for the six faces of the arch stones.

2. Explain the different systems of construction in oblique bridges, and compare their relative advantages and disadvantages. Sketch the projections for the so called helicoidal, logarithmic and corne de vache arches.

10. CIVIL ENGINEERING.—PROFESSOR FUERTES.

Describe the modes of rupture of several kinds of arches. Find the pressure per units of surface upon the joints of an arch.

5. Establish Van Buren's general equation for calculating the stability of retaining walls. Discuss its applications in a general way.

7. Manipulations of mortars and concrete. Theory of mortars.

9. Classification of tunnels, their dimensions, form, etc. Running the shafts.

11. Driving the headings. Poling boards.

13. Staking out the longitudinal profile underground. Laying out the transverse section of a tunnel.

5. MECHANIC ARTS.

I. LINEAR DRAWING.—PROFESSOR MORRIS.

SECOND YEAR.—FIRST TERM.

1. To divide the line A B into any number of equal parts. Let the number be 7, 9, 13.
2. To construct a square on a given diagonal AB.
3. To inscribe a square in any triangle ABC; in a given trapezium ABCD.
4. On a given line AB construct a regular pentagon; a regular heptagon.
5. To inscribe three equal circles in a given circle.
6. The diameters being given, draw an ellipse by intersecting arcs.
7. To construct a parabola, the base AB and abscissa CD being given.
8. To draw a hyperbola, having given the diameter AB, the abscissa and double ordinate CE.
9. To describe the cycloid, epicycloid, hypocycloid.
10. To draw a circle which shall touch both lines of an angle and shall pass through a given point P.

II. ORTHOGRAPHIC PROJECTION.—PROFESSOR MORRIS.

SECOND YEAR.—SECOND TERM.

1. Give the plan and elevation of a line 2 inches long when it is inclined at 70 degrees to the horizontal and 45 degrees to the vertical plane.

2. Give plan and elevation of a square plane, 3 inches side when one of its diagonals is at 45 degrees to the horizontal and 60 degrees to the vertical plane, the other diagonal being parallel to the horizontal plane.

3. Give plan and elevation of a cube, 2 inches side, when resting on one of its solid angles, one diagonal of the base being at 50 degrees to the horizontal and the other 90 degrees to the vertical plane.

4. Draw the plan and elevation of a cylinder 5 inches long and 2 inches in diameter, when the axis is inclined at 60 degrees to the horizontal and 45 degrees to the vertical plane.

5. A pipe of sheet iron, 2 inches diameter, is to be joined so as to turn an angle of 120 degrees. Show on an elevation the inclination of the line of section, and show on a development the line in which the metal must be cut to form the required parts.

6. A cylinder 2½ inches in diameter and 6 inches long, is penetrated by another 1½ inches in diameter and 5 inches long, their axes being at right angles to each other and intersecting at their centres. Show the mode of obtaining the curves of penetration and the development of the larger cylinder.

III. MECHANISM (WILLIS')—PROFESSOR MORRIS.

THIRD YEAR.—SECOND TERM.

1. Draw diagrams and explain the method of finding the velocity ratio in link-work. Give corollaries.

2. Bevel gearing.—The position of the axes being given and also the ratio of the angular velocities, describe the frustra of the cones; also find the angles at the vertices.

3. Teeth of wheels.—To find the smallest number of teeth or pins that can be employed when the pins have no sensible diameter.

4. Describe the odontograph and the method of using it.

5. To describe the teeth of wheels when their axes are not parallel. Example, bevel wheels.

6. In the communication of motion by sliding contact, directional relation changing, how may a varying velocity ratio be obtained?

7. Communication of motion by link-work. Problem: To determine the motion of a slide when the path of the end of the link travels in a line that does not meet the axis; what is the effect of changing the length of the link or connecting rod?

8. Trains of elementary combinations. Problem: Given the velocity ratio of the extreme axes or pieces of a train, to determine the number of intermediate axes and the proportions of the wheels or number of their teeth.

9. How may parallel motions be obtained?

10. Determinate changes—speed pulleys. Problem: Let there

be a set of six speed-pulleys, in each group of which the diameters of the extremes are thirteen inches and four inches, to find the intermediate diameters.

IV. STEAM-ENGINE.—PROFESSOR MORRIS.

THIRD YEAR.—THIRD TERM.

1. Describe the principal parts and appendages of boilers and furnaces.
2. State the difference between a high and a low pressure steam-engine.
3. Describe the principal parts and appendages of a high pressure steam-engine.
4. The same of a low pressure steam-engine.
5. State what you can of testing of boilers, explosions of boilers, incrustation, and care of boilers.
6. How are steam-engines classed?
7. What do you understand by a horse power?
8. How do you ascertain the nominal horse power of high pressure engines?
9. What effect is produced upon the crank pin of a locomotive by changing the length of the main rod, when the cross-head is at the centre of its travel?
10. Where is the crank pin when the piston is at the centre of its stroke, the main rod being four times the length of the stroke?
11. Describe the link-motion.
12. What do you understand by the terms "lead," "lap?"

V. MATERIALS EMPLOYED IN THE CONSTRUCTION.—PROFESSOR MORRIS.

FOURTH YEAR.—FIRST TERM.

1. Divisions of the subjects.
2. Conversion of ore into cast iron.
3. Manufacture of wrought iron.
4. Steel and its production.
5. Characteristics of cast iron, wrought iron and steel.
6. Describe tempering, annealing, case hardening.
7. Zinc, tin, lead, copper and their most useful alloys.
8. Other materials besides the metals used in construction.
9. Care and preservation of materials.

VI. DESIGNING OF MACHINERY.—PROFESSOR MORRIS.

FOURTH YEAR.—FIRST TERM.

Select from the following subjects; give complete and detail drawings, with specifications and probable cost.

1. Lathe.—Screw feed. Slide rest, back-geared; swing, 16 inch: bed, 9 ft.
2. Planing Machine.—To plane 22 inches wide, 20 inches high, cross and angular feed.
3. Crank planer with adjustable stroke from 16 inches down; planing 15 inches wide, 13 inches high.
4. Back-geared drill with self-feeding attachment. Traverse of table, 26 inches; of spindle, 12 inches; distance between table and spindle 34 inches; distance between base and spindle 44 inches.
5. Ten H. P. portable engine best suited to agricultural work.

VI. NATURAL HISTORY.

I. BOTANY.

I. SYSTEMATIC AND APPLIED BOTANY.—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—FIRST TERM.

1. Name the five principal groups into which plants are arranged in the natural system of classification.
2. State briefly the distinguishing characteristic of each of these groups.
3. What are plant characters?
4. From what parts of plants are characters of the highest importance derived?
5. Define species, genus, and order.
6. Name ten natural orders which can be easily distinguished by brief characters and state what these characters are.
7. Give a schedule of some species of Rosaceæ proper.
8. On what principle and by whom was the present arrangement of natural orders first adopted?
9. Why is it impossible to express the affinities of the natural orders in a linear arrangement?
10. Mention such indigenous Saxifragaceæ as you know to abound in the flora of Ithaca.
11. Name the cultivated Saxifragaceæ.
12. Name the six largest natural orders in regard to the number of species.
13. Give an account of the distribution of the species of the orders Magnoliaceæ, Leguminosæ, Compositæ and Gramineæ.
14. What are the six most important orders as furnishing food plants in temperate regions?
15. What six orders furnish the most important timber plants?
16. Name the orders which furnish the most extensively used medicines.
17. Name the four plants which furnish very extensively used beverages in different parts of the world, state the order to which each belongs, and give some account of its natural history.

18. The same of the four important sugar-producing plants.

19. Enumerate the products of Euphorbiaceæ, Urticaceæ, Solonaceæ, Chenopodiaceæ, Cruciferæ and Coniferæ, giving as far as possible the scientific names of the most important plants.

20. What orders form the natural group called Amentaceæ?

21. Characterize the sub-orders of Rosaceæ, Leguminosæ, and Compositæ.

22. How do Cyperaceæ differ from Gramineæ?

23. Into what groups can Gramineæ be conveniently arranged for purposes of study?

24. State what the following vegetable products are, and name the plants which produce them: camphor, ginger, alkanest, elaterium, aloes, gum arabic, manna, caoutchouc, gum lac, cinnamon, cloves, nutmeg, turpentine, opium, logwood, rattan, boxwood, asafœtida, croton oil, fustic, jute, saffron, tonka bean, jujube, vanilla.

25. Give some statistics of species, genera, and orders, and of indigenous and introduced plants.

II. VEGETABLE PHYSIOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Describe the vegetable cell and treat of its structure, different forms and physical properties.

2. Give a classification of the different contents of cells and name those of each class.

3. Define and describe the different kinds of plant tissue.

4. Name the fundamental plant organs.

5. What are homologous organs?

6. What is absorption? Give an account of the result of the latest researches concerning this function of plants.

7. What is transpiration? Show how the existence of this function may be demonstrated and the amount of transpiration measured.

8. Treat of plant respiration.

9. Give some account of circulation in plants, and of crude and elaborated sap.

10. Describe the process of assimilation, and name the conditions under which it takes place.

11. Give a classified table of the products of assimilation.

12. Write out an account of starch, describing its formation, structure, variation, and use in the economy of the plant.

13. Name the four elements of the organic constituents of plants, and explain their source in nature.

14. Treat of plant food.

15. How do fertile differ from poor soils in relation to plant growth?

16. Give diagrams of cross sections of exogenous, endogenous and cryptogamous stems, the first in full detail of structure.

17. Describe the medullary system of the exogenous stem in reference to the grain of cabinet and finishing woods.
18. What are the organs of fructification in the phænogamia?
19. Show that a flower is homologous with a branch.
20. Describe the process of fertilization in the phænogams.
21. What is the present state of knowledge in regard to the sexuality of cryptogams?
22. Describe the process of fertilization in Filices.
23. How do seeds differ from spores?
24. Describe briefly the methods instituted by nature for the distribution of the species of plants.

III. FUNGOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Draw a diagram of Æcidium Claytoniatum, and explain its structure.
2. State the specific differences of Æ. Claytoniatum and Æ. berberidis.
3. Explain the structure and supposed office of spermogonia.
4. What is meant by di-morphism?
5. Give an illustration from the false species Uredo rosæ.
6. What effect have parasitic fungi on the plant which nourishes them?
7. What is meant by alternate generation?
8. Illustrate this by a description of the change of forms in Uromyces appendiculatus.
9. Explain the structure of the conidia of Cystopus candidus.
10. Also the zoöspores of the same plant.
11. How is the parasitic fungus of any given crop transmitted to the succeeding crop?
12. Give the result of Doctor de Bary's experiment with the zoöspores of C. candidus.
13. Under what name is the immature wheat rust known?
14. What advantage to parasitic fungi is the production of different forms of fruit?
15. What remedies are available for rust in wheat?
16. Give a description of corn smut.
17. Also of the disease known as bunt.
18. Give some account of the potato rot fungus.
19. Also of the mildew of the grape vine.
20. What remedy is applicable to the latter disease?
21. What is the vinegar plant?
22. How do fungi induce fermentation?
23. What is known of the fungus which causes the disease called yellows?
24. Describe the fungus which causes the black-knot of plum and cherry.

25. How do fungi produce the decay in timber called dry-rot?
26. How may the attack of this fungus be prevented?
27. Draw a vertical section of Agaricus campestris, and name the parts.
28. How are edible distinguished from poisonous fungi?
29. State the characteristics of the six families of fungi.
30. Give a brief general description of fungi, as to their size, form and color.
31. Compare fungi with phænogamia as to their nutrition.
32. What are the uses of fungi?
33. Mention the diseases caused by fungi, in which prevention or remedy is practicable.
34. Also those in which no available remedy is known.
35. Mention the species of fungi which produce secondary forms of fruit on which false species have been founded.

2. ZOOLOGY.

I. ECONOMIC ENTOMOLOGY—INSTRUCTOR COMSTOCK.

1. Describe the articulate plan of structure.
2. Characterize the class *Insecta*.
3. Give tabular arrangement of the orders and suborders of the class *Insecta*.
4. Characterize the order *Hexapoda*.
5. Characterize the suborder *Lepidoptera*.
6. Explain the terms, larva, pupa, chrysalis, imago, incomplete metamorphoses and complete metamorphoses.
7. Give tabular arrangement of the typical mouth-parts of a true insect (*Hexapoda*).
8. What hymenopterous insects are social, and how do they differ from closely allied solitary forms?
9. Name two families of the *Hymenoptera* that are parasitic. Describe briefly their habits.
10. Characterize and give the habits of the *Sphingidae*; also *Aegeriadae*.
11. Describe the habits of the coddling-moth. Name remedies.
12. Describe the metamorphoses of the mosquitoes.
13. Describe the habits of the ground-beetles (*carabidae*), May-beetles (*Lachinosterna*), *Saperda Bivittata*, plant-lice, the snowy tree-cricket, ant-lion, aphis-lion and caddis-worms.

II. COMPARATIVE ANATOMY—PROFESSOR WILDER.

[*This is a special course for the students in the Natural History course and for others who choose to take it. It extends through the second and third terms. The subjects vary from year to year, the purpose being to give a complete account of a few forms or groups of animals, with discussion of their relative and bibliographical references*].

1. Enumerate the fishes of Cayuga lake.
2. Contrast the external and internal structure of the lamprey (*Petromyzon*), and the eel (*Anguilla*.)
3. Describe the development of *Petromyzon*.
4. Give diagrams (as transverse and longitudinal views) of the respiratory apparatus of *Amphioxus*, *Myxime*, *Bellostoma* and *Petromyzon*.
5. Give the external and internal characters of *Amia*, and name the teleostean genera to which it has some resemblance.
6. Compare the gar-pike (*Lepidostens*) with the sturgeon (*Accipenser*.)
7. Describe the brain of *Menobranchus*, and compare it with the brains of other Batrachians.

3. GEOLOGY.

In consequence of the absence of Professor Hartt in Brazil no examination papers can be given that will adequately represent the work done in the special department of geology.

DEGREES AND PRIZES.

FOR 1874–5.

SEVENTH ANNUAL COMMENCEMENT.

THURSDAY, JUNE 17, 1875.

The Lord's Prayer.

1. ORATION: Different Phases of Religious Toleration, GEORGE ROLANDSON THOMPSON, *Pleasant Hill, Del.*
2. *PHILOSOPHICAL ESSAY: Shakespeare and Swedenborg; the Poetic and the Philosophic Interpreter of Nature, WILLIAM OSCAR BATES, *Indianapolis, Ind.*
3. ESSAY IN ARCHITECTURE: Sculpture and its Relation to Architecture, ALMON WHEELER BULKLEY, *West Groton.*
4. *THESIS IN AGRICULTURE: The Principles of Thorough Draining, WILLIS MERWIN STURGES, *Mansfield, O.*
5. ORATION: The Sources of Milton's Culture, FRANK HARRIS HISCOCK, *Syracuse.*
6. ORATION: Rousseau as a Philosopher of the French Revolution, FRANK PIERCE SMITH, *South Granville.*
7. *THESIS IN CHEMISTRY: Development in Iron Manufacture, EDWARD TATNALL BETTS, *Wilmington, Del.*
8. ESSAY IN NATURAL HISTORY: The Geology of Ithaca and the Vicinity, FREDERIC WILLIAM SIMONDS, *Richmond, Ind.*
9. ORATION: The Iphigenia of Euripides and of Goethe, MARY HOLMAN LADD, *Boston, Mass.*
10. ORATION: The Religious Idea and the Obstacles to its Development, JARED TREMAN NEWMAN, *Ithaca.*
11. *THESIS IN CIVIL ENGINEERING: Review of the Tower of the Spectacle Reef Lighthouse, Lake Huron, MERVALE DALTON MAKEPEACE, *Pamelia.*
12. *THESIS IN NATURAL HISTORY: The Anatomy of a Hydrocephalus Brain, EUGENE CORSON, *Ithaca.*
13. *THESIS IN MECHANICAL ENGINEERING: Iron and Steel, GEORGE SYLVANUS MOLER, *Buda, Ill.*

* Not read.

14. ESSAY IN CIVIL ENGINEERING: The Mathematical Theory of Probabilities,
ERASMUS DARWIN PRESTON, *Oak Hill, Pa.*
15. ORATION: The Secular Policy of the German Empire,
DANIEL JAMES TOMPKINS, *Fulton.*
16. *THESIS IN MECHANICAL ENGINEERING: Criticism of a Steam Rock Drill,
EDMUND LE BRETON GARDNER, *New York City.*
17. *THESIS IN ARCHITECTURE: Sir Christopher Wren,
EHRICK KENSETT ROSSITER, *New York City.*
18. *THESIS IN CIVIL ENGINEERING: Design for a Union Depot Roof Truss,
PHILIP HENRY PERKINS, *Kennebunk Port, Me.*
19. THE WOODFORD PRIZE ORATION: Nationality in Literature, GEORGE HAMLIN FITCH, *New Brighton.*

Presentation of Prizes.

Conferring of Degrees and Certificates by the President.

BENEDICTION.

DEGREES CONFERRED IN 1875.

The following is a list of those who received degrees at the annual Commencement at the close of the seventh academic year, together with the degrees conferred and the residence of each recipient:—

BACHELORS IN ARTS, (8).

VERNON LEWELLYN DAVY,	Groton.
FREDERICK HATCH,	Cortland.
FRANK HARRIS HISCOCK,	Syracuse.
HENRY BROOKS KNIGHT,	Monroe.
MARY HOLMAN LADD,	Boston, Mass.
HENRY WILBUR SACKETT,	Ithaca.
JOSEPHINE JULIA THOMAS,	Richmond, Ind.
JOHN WORTHINGTON,	Pittsford, Ill.

BACHELORS IN PHILOSOPHY (5).

WILLIAM OSCAR BATES,	Harrisburg, Ind.
SAMUEL WARNER CARPENTER.	Cincinnati, Ohio.
JARED TREMAN NEWMAN,	Ithaca.
HENRY HURD ROBERTS,	Rock Stream.
DANIEL JAMES TOMPKINS,	Fulton.

BACHELORS IN SCIENCE (18).

HOWARD PERCY BELLOWS,	Boston, Mass.

* Not read.

ALICE RUSSELL BRADFORD,	Boston, Mass.
CHARLES FRANKLIN BURT,	West Kendall.
JOSEPH WRIGHT DEAN.	Lee's Summit, Mo.
GEORGE HAMLIN FITCH,	Ithaca.
CHARLES SUMNER HARMON,	Blue Island, Ill.
OWEN HARRIS,	Locke.
DUDLEY RETURNED HORTON,	City Island.
EDWIN JACKSON,	Wilmington, Del.
EDWARD LEAMINGTON NICHOLS,	Peekskill.
EBENEZER JEWETT PRESTON,	South Dover.
AUSTIN FISKE SHAW,	Maquoqueta, Ia.
FRANK PIERCE SMITH,	South Granville.
FRED PHILIP STEPHENS,	Ithaca.
GEORGE ROLANDSON THOMPSON,	Pleasant Hill, Del.
WIBRAY JAMES THOMPSON,	Chicago, Ill.
VINCENT SEAMAN WALSH,	Great Bend, Pa.
FRANK POMROY WHEELER,	Brattleboro, Vt.

GRADUATE IN CHEMISTRY (1).

EDWARD TATNALL BETTS,	Wilmington, Del.

GRADUATES IN NATURAL HISTORY (2).

EUGENE CORSON,	Ithaca.
FREDERIC WILLIAM SIMONDS,	Richmond, Ind.

BACHELOR IN AGRICULTURE (1).

WILLIS MERWIN STURGES.	Mansfield, Ohio.

BACHELORS IN ARCHITECTURE (4).

ALMON WHEELER BULKLEY,	West Groton.
ISAAC EDGAR HUTTON,	Nanuet.
EHRICK KENSETT ROSSITER,	New York City.
CHARLES CYRUS KING,	Belmont.

BACHELORS IN CIVIL ENGINEERING (8).

ISAAC NEWTON COOK,	Jersey City, N. J.
OSCAR WOOD FERGUSON,	New Milford.
EDWARD GEORGE,	Nassau, N. P.
ALMON CLAYTON GREENE,	Palmyra.
MERVALE DALTON MAKEPEACE,	Pamelia.
PHILIP HENRY PERKINS,	Kennebunkport, Me.
ERASMUS DARWIN PRESTON,	Oak Hill, Pa.
GEORGE TATNALL,	Wilmington, Del.

BACHELORS OF MECHANICAL ENGINEERING (5).

ARTHUR AZEL BEATTIE,	Salem.
SAMUEL JOSEPH BUNTING,	Yardleyville, Pa.
EDMUND LE BRETON GARDINER,	New York City.
ALBERT RUFUS GILLIS,	Kinsman, O.
GEORGE SYLVANUS MOLER,	Buda, Ill.

SECOND DEGREES.

MASTERS OF SCIENCE.

HERBERT EDSON COPELAND, B. S.
EVA MARIA PITTS, B. S.
CLINTON DEWITT SMITH, B. S.

The degree of Master of Science had been conferred on GEO. EDWARD PATRICK in the autumn of 1874-5.

LICENTIATES.

CHARLES W. RAYMOND, Surveying and Draughting.
WILLIAM G. HALSEY, Mechanical Draughting.
IDA PRESTON, Botany and Floriculture.

PRIZES AWARDED.

The following is a list of prizes awarded in the University during the seventh academic year—1874-5:—

WOODFORD PRIZE.

GEORGE HAMLIN FITCH, a Gold Medal, of one hundred dollars.

PRESIDENT'S PRIZES.

In English Literature—FRANK ELIJAH HEATH, first prize, thirty dollars; FRANK PIERCE SMITH, second prize, twenty dollars.

In Geology.—FREDERIC WILLIAM SIMONDS, thirty dollars.

In Physiology—ALBERT HENRY C. S. JONAS, first prize, thirty dollars; THEODORE LUQUEER MEAD, second prize, twenty dollars. Mr. MEAD also to the best lecture on a special subject in Physiology, twenty dollars.

Horace K. White Prizes in Veterinary Science—Two equal prizes to HENRY JOSEPH RICE and SIMON HENRY GAGE, of fifteen dollars each.

PRIZES FOR UNDERGRADUATES.

The following prizes are offered for the year 1875-6.

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford Prize the present year are as follows:

1. The Old Prometheus and the New.
2. The Reciprocal Influence of Nations.
3. 1776 and 1876.
4. National Vanity.
5. Mary Somerville.
6. Charles James Fox as an Orator.
7. The Sacrifice of Genius to English Social Institutions.
8. Mathematics in Nature.

ROSSITER PRIZE IN ARCHITECTURE.

A sum of Thirty Dollars is offered by Ehrick K. Rossiter, a graduate of 1875 in this department, for the best design by any member of the Senior class in Architecture, the successful competitor to leave his design for exhibition on the walls of the draughting-room.

THE HORACE WHITE PRIZE.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars;* to the second in merit, *Ten Dollars.*

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

ARTICLE I.

1. There shall be two standing committees, an executive committee and an auditing committee.

2. The executive committee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

4. The order of business at each regular meeting shall be as follows:—

(*a*) The secretary shall ascertain the names of the members present by roll call or otherwise.

(*b*) Reading the minutes of the last meeting.

(*c*) Treasurer's report and the referring of it to the auditing committee.

(*d*) Report of the executive committee.

(*e*) Reports of special committees.

(*f*) Miscellaneous business.

(*g*) Election of officers and committees.

(*h*) Election of Trustee or Trustees.

(*i*) Adjournment.

ARTICLE 2.

1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not herein before provided for, shall be elected as follows: The president by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of New York, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1875—6.

President—L. H. BARNUM.

Vice-Presidents—J. B. FORAKER, '69; T. W. SPENCE, '70; S. F. HUNTLEY, '71; C. L. CRANDALL, '72; S. SMITH, '73; L. M. FULTON, '74.

Recording Secretary and Treasurer—G. W. HARRIS.

Corresponding Secretary—FOX HOLDEN.

Executive Committee—R. G. H. SPEED; O. A. DERBY; W. R. DUDLEY; FOX HOLDEN; G. W. HARRIS.

Auditing Committee—C. E. VANCLEEF; E. W. HYDE; L. ELSBREE.

Orator—G. A. BENTON.

Alternate—H. V. L. JONES.

Poet—FRANK CARPENTER.

Alternate—W. R. DUDLEY.

TRUSTEES ELECTED.

1874, S. D. HALLIDAY, A. B. 1875, HON. D. BOARDMAN.

MEMBERS OF THE ASSOCIATION.

GRADUATED IN 1869. [8]

* The star denotes deceased graduates.

G. F. Behringer, A. B.
M. B. Buchwalter, A. B.
J. B. Foraker, A. B.
C. F. Hendryx, A. B.
J. Kirkland, A. B.
J. A. Rea, A. B.
D. W. Rhoades, A. B.
O. F. Williams, A. B.

GRADUATED IN 1870. [24]

A. A. Andrews, B. S.
S. S. Avery, B. S.
J. S. Butler, B. S.
J. J. Chambers, Ph. B.
T. B. Comstock, B. S.
B. V. B. Dixon, A. B.
E. Douglas, A. B.
H. T. Eddy, C. E., (Ph.D., '72).
A. R. Greene, A. B.
S. D. Halliday, A. B.
E. D. Jackson, Ph. B.
H. V. L. Jones, Ph. B.
G. H. Lothrop, Ph. B.
G. M. Luther, B. S.
J. L. Maxwell, Ph. B.
P. Mosher, A. B,
C. J. Powers, B. S.
C. L. Powers, B. S.
E. F. Robb, A. B.
M. M. Ross, B. S.
P. G. Schoeder, Ph. B.
T. W. Spence, A. B.
C. A. Storke, A. B.
F. Walters, Ph. B.

GRADUATED IN 1871. [40]

W. S. Barnard, B. S.
L. H. Barnum, Ph. B.
G. A. Benton, A. B.
P. C. J. De Angelis, A. B.
A. B. Doerflinger, B. C. E.

A. H. Edgren, Ph. B.
W. Farnham, B.C. E., (C. E., '74).
A. N. Fitch, Ph. B.
O. Gillett, B. C. E.
E. J. Hadley, B. S.
W. H. Hayes, B. S.
I. Hoagland, B. S., (Ph. B., '72).
S. F. Huntley, B. S.
K. W. Ingham, Ph. B.
G. W. Ingraham, A. B.
M. Kasson, B. V. S.
R. O. Kellogg, Ph. B.
E. D. Leffingwell, B. S.
J. J. Lockhart, B. S.
J. M. McNair, B. S.
W. S. McGregor, B. S.
J. E. More, A. B.
M. J. Morse, Ph. B.
J. O'Neill, A. B.
E. L. Parker, A. B.
C. E. Reeves, B. S.
F. H. Remington, B. S.
A. J. Rogers, Ph. B.
W. P. Ryman, B. S.
S. W. Salmon, B. C. E.
F. Schoff, B. C. E.
A. H. Sewell, B. S.
F. Sherman, B. S.
G.L.T. Smith, B.C.E., (C.E., '74).
M. A. Smith, B. C. E.
R. G. H. Speed, Ph. B.
R. Taft, B. S.
W. H. Tallmadge, A. B.
C. E. Van Cleef, B. S.
W. DeL. Wilson, A. B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph. B.
M. C. Bean, B. C. E.
C. H. Blair, A. B.
D. W. Bowman, B. C. E.
E. L. Brady, B. S.
G. F. Breed, Ph. B.
H. S. Buffum, B. S.
J. M. Chase, B. S.
I. E. Clark, B. C. E.
A. C. Clement, B. S.
A. W. Clinton, B. S.
D. Colburn, B. C. E.
M. T. Conklin, B. S.
H.E. Copeland, Ph.B., (M.S., '75).
C. L. Crandall, B. C. E.
C. S. Crofoot, Ph. B.
Gram Curtis, B. C. E.
D. M. Darrin, B. S.
L. A. Foster, B. S.
F. W. Frost, B. C. E.
A. N. Fuller, B. S.
W. Harkins, B. S., (B. Lit., '73).
R. Headley, B. S.
H. C. Henderson, B. C. E.
I. N. L. Heroy, B. S.
W. E. Holcomb, B. S.
F. Holden, A. B.
R. B. Howland, B. C. E.
J. H. Hurd, B. S.
E. W. Hyde, B. C. E., (C. E., '74).
G. A. Iselin, B. S.
D. S. Jordan, M. S.
L. F. Judson, B. S.
M. Kellogg, B. S.
J. B. Lawrence, Ph. B.
W. N. B. Lawton, Ph. B.
W. B. Leach, B. S.
J. W. Mack, B. S.
J. T. McCollum, B. S.
T. J. McConnon, B. S.
E. E. McElroy, B. S.
F. D. Nash, B. S.
E. Nicoll, B. S.
W. H. Niles, B. S.
A. Osborn, A. B.
D. M. Page, B. S.
M. G. Peters, B. S.
A. C. Pike, B. S.
G. W. Pitts, B. S.
H. G. Pollock, B. S.
C. S. Price, B. C. E.
A. L. Rader, Ph. B.
A. Rogers, B. C. E.
D. E. Salmon, B. V. S.
T. Sanderson, A. B.
W. I. Scott, B. S.
G. P. Serviss, B. S.
C. B. Sill, B. C. E.
C. Smith, B. S.
L. P. Smith, B. S., (Ag. B., '74).

M. G. Stolp, B. C. E.
S. P. Thomas, B. C. E.
J. E. Van De Carr, B. S.
J. DeW. Warner, Ph. B.
A. C. Weeks, B. S.
S. N. Williams, B. C. E.
E. V. Wilson, B. S.
T. H. Wolford, B. S.
W. J. Youngs, B. S.

GRADUATED IN 1873. [95]

C. F. Allen, B. C. E.
H. Altman, B. S.
R. Anderson, B. M. E.
J. C. Averill, B. S.
A. B. Aubert, B. S.
R. Bacon, B. S.
E. Bartley, B. S.
S. F. Belknap, B. S.
H. E. Blake, B. C. E.
L. G. Boies, A. B.
I. W. Boothby, B. S.
S. W. Brown, B. S.
Frank Carpenter, B. C. E.
F. H. Carver, B. S.
A. B. Cauldwell, B. S.
J. Chamberlin, B. S.
J. P. Church, B. C. E.
J. T. Cothran, A. B.
W. H. Denham, B. S.
O. A. Derby, B. S., (M. S., '74).
Geo. Devin, B. C. E.
E. T. Diefendorff, B. S.
E. G. Donaldson, B. Lit.
G. F. Dudley, B. S.
W. F. Duncan, B. S.
E. S. Eastman, Ph. B.
L. Elsbree, A. B.
L. Everett, B. S.
J. B. Ewell, B. S.
L. S. Falkeneau, B. C. E.
F. B. Ferriss, B. S.
P. D. Finnegan, A. B.
C. Finster, A. B.
N. K. Foster, B. S.
J. Frankenheimer, Ph. B.
M. R. Frazer, A. B.
A. Gridley, B. S.
F. N. Hagar, A. B.
F. W. Halsey, B. S.
G. W. Harris, Ph. B.
A. C. Harwick, B. S.
J. W. Hill, B. M. E.
G. W. Horner, B. C. E.
E. M. Howard, B. S.
A. T. Hyde, B. C. E.
H. C. Johnson, A. B.
*F. H. Jones, B. Lit.
C. S. Joy, A. B.
F. W. Kelley, A. B., (Ph.D., '74).
W. L. Klein, B. S.
F. J. Knight, B. C. E.
J. M. Knowles, B. S.
D. E. Kohler, A. B.
C. Y. Lacy, Agr. B.
C. F. Lane, A. B.
D. T. Lawson, B. C. E.
W. Leland, B. S.
C. E. Lipe, B. M. E.
R. H. Lockwood, B. C. E.
G. F. Lyman, B. C. E.
D. W. J. Mesick, B. S.
J. L. Moffatt, B. S.
J. G. Moore, A. B.
G. C. Morehouse, B. S.
W. T. Morris, B. S.
J. G. Newkirk, A. B.
C. D. Page, B. S.
R. Parmely, B. S.
F. Parson, B. C. E.
G. E. Patrick, B. S., (M. S., '74).
G. H. Phelps, B. S.
A. H. Phinney, (B. S.,) Ph. D.
K. Preston, B. C. E.
F. W. Proctor, B. S.
F. J. Root, B. C. E.
J. R. Schoonover, Arch. B.
E. H. Scofield, A. B.
J. F. Seybolt, B. S.
M. C. Sharp, Ph. B.
M. A. Shotwell, Ph. B.
C. D. W. Smith, B.S., (M.S., '75).
C. L. Smith, B. S.
S. Smith, B. S.
W. H. Smith, A. B.
H. L. Sprague, B. S.
W. L. Sprague, A. B.

H. D. Stevens, B. S.
G. A. Tilley, B. C. E.
W. Tinning, B. S.
J. H. Tompkins, B. C. E.
G. B. Turner, B. S.
M. W. Van Auken, A. B.
C. F. Wheelock, B. S.
T. S. White, B. C. E.
T. Worthington, Ph. B.

GRADUATED IN 1874. [64].

F. B. Alexander, B. C. E.
Geo. Berry, Arch. B.
N. W. Cady, Ph. B.
C. W. Candee, B. S.
J. D. Case, B. S.
J. F. Cluck, A. B.
J. H. Comstock, B. S.
F. W. Cooper, Arch. B.
O. H. P. Cornell, C. E.
J. A. Dobroluboff, B. C. E.
W. R. Dudley, B. S.
H. L. R. Fairchild, B. S.
W. R. Fitch, B. C. E.
S. P. Fleming, A. B.
W. H. Flint, A. B.
R. B. Foster, B. C. E.
L. M. Fulton, B. S.
Wallace Green, B. C. E.
H. M. Gillett, B. S.
T. Hampson, Lit. B.
J. T. Hay, B. S.
B. A. Hayes, Lit. B.
L. T. Henderson, Ph. B.
H. M. Hibbard, B. C. E.
H. L. House, A. B.
J. T. Hurd, B. S.
W. H. Janney, B. C. E.
E. F. P. Jordao, B. C. E.
W. A. Kellerman, B. S.
H. M. Kennedy, Lit. B.
B. W. Law, Arch. B.
C. H. Lay, B. C. E.
W. R. Lazenby, Agr. B.
H. G. Northrup, B. C. E.
J. H. Pierce, B. S.
E. M. Pitts, B. S., (M. S., '75).
C. A. Preston, B. S.
C. H. Ramsay, B. S.
E. O. Randall, Ph. B.
W. M. J. Rice, Arch. B.
H. B. Robinson, B. C. E.
B. E. Shear, Arch. B.
G. S. Sheppard, B. S.
W. M. Smith, B. S.
W. N. Smith, B. M. E.
C. W. Soulby, B. S.
J. H. Southard, B. S.
A. C. Standart, B. S.
J. L. Stone, Agr. B.
W. Swaty, B. S.
W. P. Thompson, B. S.
L. P. Tier, B. C. E.
S. E. Todd, Arch. B.
F. C. Tomlinson, B. C. E.
G. B. Upham, B. S.
J. D. Upham, B. S.
M. Van Cleef, B. S.
G. R. Van De Water, B. S.
C. W. Wasson, B. C. E.
F. W. Warthorst, B. C. E.
R. H. Wiles, B. S.
G. T. Winston, Lit. B.
C. C. Wood, B. S.
F. C. Wood, B. S.

GRADUATED IN 1875. [52].

W. O. Bates, Ph. B.
A. A. Beattie, B. M. E.
H. P. Bellows, B. S.
E. T. Betts, B. S.
A. R. Bradford, B. S.
A. W. Bulkley, Arch. B.
S. J. Bunting, B. M. E.
C. F. Burt, B. S.
S. W. Carpenter, Ph. B.
I. N. Cook, B. C. E.
E. Corson, B. S.
V. L. Davey, A. B.
J. W. Dean, B. S.
O. W. Ferguson, B. C. E.
G. H. Fitch, B. S.
E. L. B. Gardiner, B. M. E.
E. George, B. C. E.
A. R. Gillis, B. M. E.
A. C. Green, B. C. E.

C. S. Harmon, B. S.
O. Harris, B. S.
F. Hatch, A. B.
F. H. Hiscock, A. B.
D. R. Horton, B. S.
I. E. Hutton, Arch. B.
E. Jackson, B. S.
C. C. King, Arch. B.
H. B. Knight, A. B.
M. H. Ladd, A. B.
M. D. Makepeace, B. C. E.
G. S. Moler, B. M. E.
J. T. Newman, Ph. B.
E. L. Nichols, B. S.
P. H. Perkins, B. C. E.
E. D. Preston, B. C. E.
E. J. Preston, B. S.
H. H. Roberts, Ph. B.
E. K. Rossiter, Arch. B.
H. W. Sackett, A. B.
A. F. Shaw, B. S.
F. W. Simonds, B. S.
F. P. Smith, B. S.
F. P. Stephens, B. S.
W. M. Sturges, Agr. B.
G. Tatnall, B. C. E.
J. J. Thomas, A. B.
G. R. Thompson, B. S.
W. J. Thompson, B. S.
D. J. Tompkins, Ph. B.
V. S. Walsh, B. S.
F. P. Wheeler, B. S.
J. Worthington, A. B.

PREPARATORY SCHOOL.

During the Summer Vacation of 1876 *the undersigned will remain in Ithaca and give instruction in Studies required for admission or advanced standing in the University. On* SEPTEMBER 15, 1876, *they will open rooms in town, for the instruction of classes or single pupils in the studies of any of the preparatory courses, and in the Languages and Mathematics required in any of the courses of the University.*

Inquiries may be addressed to either of the undersigned, ITHACA, N. Y.,

B. P. MacKoon. L. A. Wait.

THE

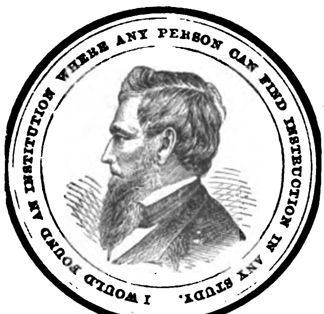
CORNELL

University Register

AND CATALOGUE

1876-77

THIRD EDITION



Ithaca

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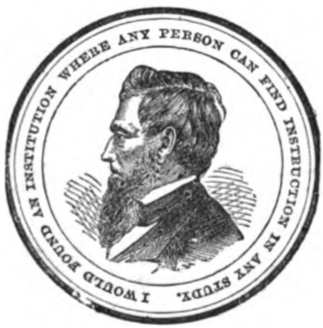
THE

CORNELL

UNIVERSITY REGISTER

AND CATALOGUE

1876-77



ITHACA

PUBLISHED BY THE UNIVERSITY

1876

CONTENTS.

THE CALENDAR.

1876		Sept. 11	Fall Term.
September	11	Monday	Entrance Examinations.
September	12	Tuesday	Entrance examinations continued.
September	13	Wednesday	REGISTRATION for the Term.
September	14	Thursday	Instruction begins.
November		Thursday and Friday	THANKSGIVING.
December	11	Monday	Term Examinations begin.
December	15	Friday.	Term ends.
1877		Jan. 9.	Winter Term.
January	9	Tuesday	Entrance Examinations.
January	10	Wednesday	Examinations end.
January	11	Thursday	REGISTRATION for the Term.
January	11	Thursday	FOUNDER'S DAY.
January	12	Friday	Instruction begins.
February	22	Thursday	WASHINGTON'S BIRTHDAY.
March	19	Monday	Term Examinations begin.
March	23	Friday	Term ends.

1877 Mar. 27 Spring Term.

March	27	Tuesday	Entrance Examinations.
March	28	Wednesday	Examinations end.
March	29	Thursday	REGISTRATION for the Term.
March	30	Friday	Instruction begins.
May	4	Friday	Woodford Prize Competition.
May	21	Monday	Commencement Essays handed in.
May	30	Wednesday	DECORATION DAY.
June	4	Monday	Senior Examinations begin.
June	5	Tuesday	Examinations for Second Degrees.
June	11	Monday	Term Examinations begin.
June	16	Saturday	Term Examinations end.
June	18	Monday	Entrance Examinations.
June	19	Tuesday	Entrance Examinations end.
June	20	Wednesday	Annual Meeting of Associate Alumni.
June	21	Thursday	ANNUAL COMMENCEMENT.

1877 Sept. 18 Fall Term.

September	18	Tuesday	Entrance Examinations.
September	19	Wednesday	Entrance Examinations continued.
September	20	Thursday	REGISTRATION for the Term.
September	21	Friday	Instruction begins.

OFFICERS OF THE UNIVERSITY.

BOARD OF TRUSTEES.

OFFICERS OF THE BOARD.

HENRY W. SAGE, - - - -	*Chairman.*
W. R. HUMPHREY, - - -	*Secretary.*
J W. WILLIAMS, - - - -	*Treasurer.*

EXECUTIVE COMMITTEE.

JOHN MCGRAW, *Chairman.*
ANDREW D. WHITE.
HENRY W. SAGE.
GEORGE W. SCHUYLER.
JOHN H. SELKREG.
JOSIAH B. WILLIAMS.
S. D. HALLIDAY.
W. R. HUMPHREY.
D. BOARDMAN.
HENRY B. LORD.

J. W. WILLIAMS, Treasurer,
Secretary of the Committee.

UNIVERSITY FACULTY.*

HONORABLE ANDREW D. WHITE, LL. D., University Hill.
PRESIDENT, *Professor of History.*

WILLIAM CHANNING RUSSEL, LL. D., 83 E. Seneca St.
VICE-PRESIDENT, *Associate Professor of History and Professor of South European Languages.*

REV. WILLIAM D. WILSON, D.D., LL. D., L. H. D., 109 Cascadilla.
REGISTRAR, *Professor of Moral and Intellectual Philosophy.*

WILLARD FISKE, M. A., PH. D., University Hill.
LIBRARIAN, *Professor of North European Languages.*

GEORGE C. CALDWELL, B. S., PH. D., 148 E. Buffalo St.
Professor of Agricultural and Analytical Chemistry.
Secretary of the Faculty.

BURT G. WILDER, B. S., M. D., 58 Cascadilla.
Professor of Comparative Anatomy and Zoölogy.

JAMES RUSSELL LOWELL, M. A., Cambridge, Mass.
Non-Resident Professor of English Literature.

GOLDWIN SMITH, L.L. D., L. H. D., Toronto, Canada.
Lecturer on English and Constitutional History.

JAMES LAW, F. R. V. C., University Hill.
Professor of Veterinary Medicine aud Surgery.

THEODORE W. DWIGHT, LL. D., New York City.
Non-Resident Professor of Constitutional Law.

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* Arranged, with the exception of the officers of the Faculty, in the order of seniority of appointment. In case, however, any Professor has been an Assistant-Professor first, his name occurs in the order of the date of the latter appointment.

CHARLES FRED HARTT, M. A., [Absent in Brazil.]
Professor of General, Economic and Agricultural Geology.

ALBERT N. PRENTISS, M. S., 116 Cascadilla.
Professor of Botany, Horticulture and Arboriculture.

JOHN L. MORRIS, M. A., C. E., University Avenue.
Professor of Mechanical Engineering and Machine Construction.

ZIBA HAZARD POTTER, M. A., M. D., LL. B., 137 Cascadilla.
Assistant Professor of Mathematics.

CHARLES A. SCHAEFFER, M. A., PH. D., Cor. Seneca and Factory.
Professor of General and Analytical Chemistry, and Mineralogy.

WATERMAN T. HEWETT, M. A., Giles Place
Assistant Professor of German.

BELA P. MACKOON, M. A., 93 E. Buffalo St.
Assistant Professor of German.

BAYARD TAYLOR, M. A., Kennet Square, Pa.
Non-Resident Professor of German Literature.

CHARLES H. WING, B. S., Jamaica Plain, Mass.
Non-Resident Professor of Organic Chemistry.

ALFRED STEBBINS, M. A., 110 N. Aurora.
Assistant Professor of South European Languages.

LUCIEN A. WAIT, B. A., 108 Cascadilla.
Assistant Professor of Mathematics.

TRACY PECK, M. A., Eddy St.
Professor of the Latin Language and Literature.

ISAAC FLAGG, PH. D., Pughtown Road.
Professor of the Greek Language and Literature.

CHARLES CHAUNCY SHACKFORD, M. A., University Avenue.
Professor of Rhetoric and General Literature.

REV. CHARLES BABCOCK, M. A., University Grounds.
Professor of Architecture.

HIRAM CORSON, M. A., University Hill.
Professor of Anglo-Saxon and English Literature.

WILLIAM A. ANTHONY, PH. B., Heustis St.
Professor of Physics and Experimental Mechanics.

JOHN E. SWEET, 148 Cascadilla.
Master Mechanic and Director of the Machine Shop.

T. FREDERICK CRANE, M. A., University Avenue.
Professor of Spanish and Italian and Assistant Professor of French.

JAMES EDWARD OLIVER, M. A., Heustis St.
Professor of Mathematics.

ESTEVAN A. FUERTES, PH. B., C. E., State St.
Professor of Civil Engineering.

FREDERICK L. O. RŒHRIG, PH. D., M. D., Pughtown Road.
Professor of Living Asiatic Languages, and Assistant Professor of French.

EDWIN C. CLEAVES, B. S., Cortland.
Assistant Professor of Free-hand Drawing and of Mechanical Draughting.

ISAAC P. ROBERTS, University Farm
Professor of Agriculture.

ELLIOTT W. STEWART, Buffalo, N. Y.
Non-Resident Professor of the Principles of Agriculture.

WILLIAM P. VAN NESS, 1st Lieut. U. S. Art., Quarry St.
Professor of Military Science and Tactics.

ABRAM A. BRENEMAN, B. S., 126 Cascadilla.
Assistant Professor of Applied Chemistry.

THEODORE B. COMSTOCK, B. S., 129 Cascadilla.
Assistant Professor of General and Economic Geology.

CHARLES LEE CRANDALL, C. E., West Hill.
Assistant Professor of Engineering.

HJALMAR HJORTH BOYESEN, PH. D., 120 Cascadilla.
Professor of German Literature and Assistant Professor of North European Languages.

IRVING P. CHURCH, B. C. E., 105 Cascadilla.
Assistant Professor of Engineering.

HORATIO S. WHITE, B. A., University Avenue.
Assistant Professor of Greek and Latin.

J. HENRY COMSTOCK, B. S., South University.
Assistant Professor of Entomology, and Lecturer on the Zoology of Invertebrates.

WILLIAM R. DUDLEY, M. S., Dryden Road.
Assistant Professor of Botany.

OTHER UNIVERSITY OFFICERS.

STEPHEN M. BABCOCK, A. B.,
Instructor in Chemistry.

EDMUND LE B. GARDINER, B. M. E.,
Instructor in Mathematics.

EDWARD P. JENNINGS, C. E.,
Instructor in Chemistry.

WILLIAM R. LAZENBY, AG. B.,
Instructor in Horticulture and Superintendent of the Botanical and General Garden.

GEORGE S. MOLER, B. M. E.,
Instructor in Physics.

PHILIP H. PERKINS, B. C. E.,
Instructor in Rhetoric and Composition.

FREDERIC W. SIMONDS, M. S.,
Instructor in Geology and Palæontology.

B. HERMON SMITH,
Director of the University Press and Instructor in Typography.

FRANK E. TAYLOR, B. M. E.,
Instructor in Mechanic Arts.

CHARLES A. VAN VELZER, B. S.,
Instructor in Mathematics.

GEORGE W. HARRIS, PH. B., *Assistant Librarian.*
CHARLES P. WOODRUFF, B. S., *Assistant in the Library.*
LYMAN EUGENE WARE *Master of the Chimes.*

SPECIAL FACULTIES.

AGRICULTURE—The PRESIDENT, Professor ROBERTS *Dean*, Professors CALDWELL, HARTT, LAW, PRENTISS, WILDER, and Mr. COMSTOCK.

ARCHITECTURE—The PRESIDENT, Professor BABCOCK *Dean*, Professors FUERTES, OLIVER, and CLEAVES.

CHEMISTRY AND PHYSICS—The PRESIDENT, Professor SCHAEFFER *Dean*, Professors ANTHONY, CALDWELL, WING, and BRENEMAN.

CIVIL ENGINEERING—The PRESIDENT, Professor FUERTES *Dean*, Professors ANTHONY, BABCOCK, MORRIS, OLIVER, SCHAEFFER, CHURCH, and CRANDALL.

HISTORY AND POLITICAL SCIENCE—The PRESIDENT, *Dean*, Professors RUSSEL, DWIGHT, GOLDWIN SMITH, and WILSON.

ANCIENT CLASSICAL LANGUAGES—The PRESIDENT, Professor PECK *Dean*, Professors FLAGG, and WHITE.

NORTH EUROPEAN LANGUAGES—The PRESIDENT, Professor FISKE *Dean*, Professors BOYESEN, HEWETT, MCKOON, and BAYARD TAYLOR.

SOUTH EUROPEAN LANGUAGES—The PRESIDENT, Professor RUSSEL *Dean*, Professors CRANE, ROEHRIG, STEBBINS, and JAMES RUSSELL LOWELL.

ORIENTAL LANGUAGES AND COMPARATIVE PHILOLOGY—The PRESIDENT, Professor WILSON *Dean*, Professors FISKE, RUSSEL, FLAGG, PECK, and ROEHRIG.

MATHEMATICS—The PRESIDENT, Professor OLIVER *Dean*, Professors ANTHONY, BABCOCK, FUERTES, MORRIS, POTTER, and WAIT.

THE SIBLEY COLLEGE OF MECHANIC ARTS—The PRESIDENT, Professor MORRIS *Dean*, Professors ANTHONY, BABCOCK, FUERTES, OLIVER, SWEET, and CLEAVES.

MILITARY SCIENCE AND TACTICS—The PRESIDENT, Professor VAN NESS.

NATURAL HISTORY—The PRESIDENT, Professor PRENTISS *Dean*, Professors HARTT, LAW, WILDER, WILSON, T. B. COMSTOCK, and Messrs. J. H. COMSTOCK, DUDLEY, and SIMONDS.

PHILOSOPHY AND LETTERS—The PRESIDENT, Professor SHACKFORD *Dean*, Professors CORSON, WILSON, ADLER, LOWELL, and BAYARD TAYLOR.

CATALOGUE OF STUDENTS.

RESIDENT GRADUATES.

CARPENTER, CHARLES F., B. M. E., Cornell, Utica.
Engineering.

CRANDALL, ELLA L., B. S., Cornell, Ithaca.
Natural History and Chemistry.

FOOTE, CHARLES W., A. M., Western Reserve, Tallmadge, O.
Geology and Chemistry.

FRAYER, EUGENE, A. B., Cornell, Carson, O.
Greek Language and Literature.

GARDINER, E. L. B., M. B. E., Cornell, New York City.
Metallurgy.

GARTLEY, WILLIAM H., B. M. E., Polytechnic College of Pennsylvania, Norristown, Pa.
Mechanic Arts.

GARVER, MADISON M., B. S., Cornell, Pecatonica, Ill.
Chemistry.

GREENE, ALMON C., B. C. E., Cornell, Palmyra.
History and Political Science.

HORTON, DUDLEY R., B. S., Cornell, City Island.
History and Political Science.

HUNTLEY, SANFORD F., B. S., Cornell, Union Springs.
Chemistry and Physics.

KENT, WALTER H., B. S., Cornell, Busti.
Chemistry and Physics.

PALMER, LELIA B., B. S., Cornell, Ithaca.
Comparative Anatomy.

RUEPPELE, HERMAN A., B. S., Cornell, St. Louis, Mo.
Chemistry and Physics.

RUSSEL, HOWLAND, A. B., Cornell, Ithaca.
Architecture.

SAUNDERS, CHARLES F., Arch. B., Cornell, Westerly, R. I.
History and Literature.

SMITH, BELLE, Lit. B., Oxford, Oxford, O.
Literature.

STANTON, THEODORE, A. B., Cornell, Tenafly, N. J.
History and Literature.

THOMPSON, LILLIA, B., B. S.., Whittier, Mt. Pleasant, Iowa.
History and Political Science.

TILDEN, HARRIET C., Lit. B., Cornell, Chicago, Ill.
Natural History and Chemistry.

WAGNER, EDWARD A., B. S., Cornell, Pultney.
History and Political Science.

WASHBURNE, CHARLES E., Ph. B., University of California, Homer.
Natural History and Chemistry.

WILLMARTH, CHARLES HENRY, Agr. B., Cornell, Addison, Vt.
Natural History.

WOOD, THOMAS D., Ph. B., Western University of Pa., Pittsburgh, Pa.
Mechanic Arts.

UNDERGRADUATES.

IN THE FOURTH YEAR OR SENIOR STUDIES.

Ames, Willis Chester,	Whitney's Point,	*Engineering*
Aylen, John,	Aylmer, Can.,	*Engineering*
Balch, Albert Frank,	St. Johnsbury, Vt.,	*Architecture*
Barto, Daniel Otis,	Jacksonville,	*Literature*
Bean, Charles Melville,	McGrawville,	*Agriculture*
Beaty, Jenny Bell,	Salem,	*Science*
Boynton, William Seward,	St. Johnsbury, Vt.,	*Literature*
Bramhall, William Ely,	Jersey City, N. J.,	*Engineering*
Bruce, Ida,	New York City,	*Arts*
Carman, Annis Smith,	Ithaca,	*Science*
Clark, Perry Daniel,	Forestville,	*Philosophy*

Cobb, Charles Simeon,	Andover,	*Science*
Coon, John Sayler,	Burdett,	*Mechanic Arts*
Cooper, Charles Marion,	Indianapolis, Ind.,	*Science*
Crim, Frank Dwight,	Mohawk,	*Science*
Deming, William Lloyd,	Salem, O.,	*Architecture*
Dennis, Waldo Emerson,	Amanda, O.,	*Science*
Dobbyn, William Richard,	Shetland, Canada,	*Literature, Opt.*
Dowling, Lawrence,	Bradford,	*Agriculture*
Eidlitz, Leopold,	New York City,	*Mechanic Arts*
Foster, Henry Ward,	Ithaca,	*Arts*
Francis, Charles Spencer,	Troy,	*Science*
Frota, Antonio Epaminondas de Marie,	Ceará, Brazil,	*Engineering*
Gage, Simon Henry,	Worcester,	*Natural History*
Gentleman, Willard,	Ottawa, Ill.,	*Science*
Gifford, William Stewart,	Jamestown,	*Science*
Gillett, George Washington,	Villanova,	*Philosophy*
Grove, Benjamin Hershey,	Buffalo.	*Arts*
Halsey, Frederic Arthur,	Unadilla,	*Mechanic Arts*
Haviland, Merritt Elvin,	Glen's Falls,	*Science*
Hawkins, John Henry Willis,	Ithaca,	*Architecture*
Hill, William Squire,	Rome,	*Optional*
Hine, Frank Brooks,	Edon, O.,	*Natural History*
Howard, Leland Ossian,	Ithaca,	*Science*
Keith, William,	Warsaw,	*Chemistry*
King, David Woodbury,	Chateaugay Lake,	*Architecture*
Lape, Willard Eugene,	Troy,	*Mechanic Arts*
Lehmaier, Jacob Schwartz,	New York City,	*Philosophy, Opt.*
Loos, Augustus Jacob,	Philadelphia, Pa.,	*Science*
Lucas, William Edward,	Groves, Ind.	*Philosophy*
Macpherson, David Joseph,	Bay City, Mich.	*Engineering*
Mandeville, Charles Baker,	Elida, Ill.,	*Science*
Mann, Louis Morris,	Milwaukee, Wis.,	*Engineering*
McNairy, Amos Bush,	Cleveland, O.,	*Mechanic Arts*
Mead, Theodore Luqueer,	New York City,	*Engineering*
Milford, James Stanley,	New York City,	*Science*
Monroe, James Smith,	West Milford, N. J.,	*Science*
Moraes, Domingos Correa de,	S. Paulo, Brazil,	*Engineering*
Mould, Charles Town,	Utica,	*Architecture*
Myers, Ira Henry,	Nunda Station,	*Science*
O'Neill, Everett,	Savannah,	*Philosophy*
Oppenheim, William Sigmund,	Bluffton, Ind.,	*Optional*

Ostrom, John Nelson,	East Randolph,	*Engineering*
Outerbridge, Franklin,	Bermuda, W. I.,	*Mechanic Arts*
Palmer, Edward Herenden,	Rochester,	*Science*
Patrick, Frank,	New Philadelphia, O.,	*Philosophy*
Peck, Theodore Barnard,	Bristol, Ct.,	*Architecture*
Pennock, Frederick Moses,	Ithaca,	*Agriculture*
Pleak, William Robinson,	Adams, Ind.,	*Optional*
Prado, Bento de Almeida,	Itú S. Paulo, Brazil,	*Agriculture*
Rice, Dwight Carlton,	Hamilton,	*Engineering*
Sanford, Ferdinand Van Derveer,	Warwick,	*Science*
Schwerdtfeger, Emil,	New York City,	*Arts*
Sellew, Emma Jane,	Dunkirk,	*Arts*
Sherman, Elroy Delos,	Cleveland, O.,	*Science*
Sherman, Walter Justin,	Norwalk, O.,	*Engineering*
Sinton, Margaretta Jane,	Ithaca,	*Science*
Smith, Eugene Raymond,	Islip,	*Engineering*
Smith, Samuel McKee,	Winfield,	*Philosophy*
Stevenson, John Chiles Houston,	St. Louis, Mo.,	*Philosophy*
Thomas, Howard,	Stowe, Vt.,	*Engineering*
Thomas, Martha Carey,	Baltimore, Md.,	*Arts*
Throop, William Bryant,	Hamilton,	*Engineering*
Tibbets, Addison Sebry,	Belfast,	*Engineering*
Tyndale, Hector Hilgard,	Springfield, Ill.,	*Science*
Van Dusen, Edith May,	Geneva,	*Literature*
Van Vleet, De Forest,	Candor,	*Science*
Viegas-Munis, Joaquim,	Piracicaba, Brazil,	*Engineering*
Volkman, Arthur Ludwig Karl,	New York City,	*Architecture*
Ware, Lyman Eugene,	Wrentham, Mass.,	*Mechanic Arts*
Waterman, John Sayles,	Cumberland Hill, R. I.,	*Mechanic Arts*
Weeks, Frank Peters,	Pittsburg, Pa.,	*Natural History*
White, Hamilton Saulisbury,	Syracuse,	*Science*
Wilson, Charles Forsyth,	Ithaca,	*Philosophy*

IN THE THIRD YEAR OR JUNIOR STUDIES.

Ames, Charles Wilberforce,	Germantown, Pa.,	*Literature*
Babcock, John Wesley,	Jamestown,	*Arts*
Baker, Eugene,	Ithaca,	*Science*
Ballard, Alfred Hovey,	Syracuse,	*Science*

Ballard, Samuel Thruston,	Louisville, Ky.,	*Science*
Barnard, Frank James,	Medina, O.,	*Philosophy, Opt.*
Barnes, Fannie Bates,	Pawtucket, R. I.,	*Science, Opt.*
Beahan, Willard,	Watkins,	*Engineering*
Beardsley, Arthur Eugene,	Cayuga, Ill.,	*Natural History*
Benchley, Paul Zeno,	Ithaca,	*Agriculture, Opt.*
Bishop, Irving Prescott,	Burlington Flats,	*Literature*
Bissell, Frank Edward,	South Bend, Ind.,	*Engineering*
Borden, James McKee,	Washington, D. C.,	*Mechanic Arts*
Borden, Thomas Paschal,	Denver, Col.,	*Engineering*
Bradford, Edith Woodman,	Boston, Mass.,	*Optional*
Breed, William Bradley,	Phoenix,	*Chemistry*
Brown, Andrew Wallace,	Newark, N. J.,	*Architecture*
Bruen, Frank,	Dayton, O.,	*Engineering*
Burdsall, Ellwood,	Port Chester,	*Mechanic Arts*
Burdsall, Richard Howard,	Port Chester,	*Science*
Cady, Daniel Wayland,	Peterborough,	*Arts*
Cary, Eugene,	Dunkirk,	*Science*
Clary, Walter Ware,	Syracuse,	*Literature*
Cole, Willoughby,	San Francisco, Cal.,	*Science*
Conant, Heywood,	Wilmington, Del.,	*Science*
Crandall, Clayton,	Ithaca,	*Chemistry and Physics*
Detwiler, George Knabb,	Toledo, O.,	*Architecture*
De Witt, Bessie Bell,	Owego,	*Arts*
Dyson, James,	New Britain, Ct.,	*Engineering*
Eaton, George Penston,	Oxford,	*Science*
Edwards, William Seymour,	Coalburg, W. Va.,	*Philosophy, Opt.*
Elliott, James,	Kerrsville, Pa.,	*Arts, Opt.*
Ely, William Caryl,	East Warsaw,	*Optional*
Everson, Charles Brown,	Syracuse,	*Science*
Frayer, Mary Adaline,	Carson, O.,	*Literature, Opt.*
Gottheil, William Samuel,	New York City,	*Natural History, Opt.*
Grant, Jesse Root,	Washington, D. C.,	*Science*
Green, Edward,	Utica,	*Architecture*
Hale, Frederic Albert,	Rochester,	*Architecture*
Heermans, Forbes,	Syracuse,	*Mechanic Arts*
Hill, John Thomas,	Warren, Pa.,	*Mechanic Arts*
Jarvis, George Milton,	Canastota,	*Engineering*
Johnson, Ben,	Ithaca,	*Mechanic Arts*
Jones, Horace Tuttle,	Ovid,	*Chemistry*
Jones, Lisette Frances,	Ilion,	*Science*

Kasson, Myron Cassius,	Woodstock, Ill.,	*Agriculture*
Kendall, Franklin Mason,	Attica,	*Science*
Kueffner, Otto Geo. Fred. Henry,	St. Louis, Mo.,	*Science, Opt.*
Lewis, John,	Ithaca	*Mechanic Arts*
Mahoney, John James,	Albany,	*Science*
Mann, Frank Weston,	Norfolk, Mass.	*Science*
Marx, David,	Toledo, O.,	*Engineering, Opt.*
Maxwell, Frank Adams,	Clymer,	*Engineering*
McCormick, Cyrus Hall,	Henderson, Ky.,	*Engineering*
McKay, William Lincoln,	Elmira,	*Arts*
Meeker, Frank Oliver,	Franklin, Wash. Ter.,	*Science*
Mello-Souza, Pedro de,	St. Paulo, Brazil,	*Engineering*
Merrill, Thomas Davis,	Saginaw City, Mich.,	*Engineering*
Ness, Joseph,	Hoopeston, Ill.,	*Optional*
Oliver, Mary Ellen,	Lynn, Mass.,	*Philosophy*
Painter, William Pusey,	Muncy, Pa.,	*Optional*
Patrick, Charles,	New Philadelphia, O.,	*Optional*
Pattin, William Bernice,	Fort Plain,	*Science*
Phillips, Franklin,	Newark, N. J.,	*Mechanic Arts*
Pickett, William Passmore,	Litchfield, Ct.,	*Science*
Pitcher, Mary Merrill,	Owego,	*Arts*
Preston, Edward Livermore,	Grinnell, Ia.,	*Engineering*
Putnam, Ruth,	New York City,	*Literature*
Queiroz-Telles, Antonio, neto,	S. Paulo, Brazil,	*Engineering*
Read, John Barnham,	Salt Lake City, Utah,	*Optional*
Reeves, Arthur Middleton,	Richmond, Ind.,	*Science*
Rexford, Charles Myron,	Watertown,	*Arts*
Ribeiro, Quintiliano Nery,	Minos-Geraes, Brazil,	*Architecture*
Richardson, Jeremiah Albert,	Brooklyn,	*Architecture*
Rodriguez, Francisco Valdes,	Havana, Cuba,	*Engineering*
Savage, John,	Bay City, Mich.,	*Chemistry*
Seaman, William Kelly,	Newburgh,	*Mechanic Arts*
Sellers, Elias Horning,	Fentonville, Mich.,	*Arts, Opt.*
Smith, Albert William,	Westmoreland,	*Mechanic Arts*
Thompson, Phineas Herd,	Turners,	*Science*
Tibirica, José Piratininza,	S. Paulo, Brazil,	*Mechanic Arts*
Treman, Robert Henry,	Ithaca,	*Mechanic Arts*
Trumbull, Thomas Hooker,	Washington, D. C.,	*Science, Opt.*
Van Norman, Harvey Justin,	Jasper,	*Science*
Vasconcellos, Augusto Cezar de,	Rio de Janeiro, Brazil,	*Mechanic Arts*
Wakeley, Arthur Cooper,	Omaha, Neb.,	*Literature*

Weed, Watson,	North Rose,	*Science*
Welker, Philip Albert,	Toledo, O.,	*Engineering*
Wilcox, Wallace Jay,	Ithaca,	*Mechanic Arts*
Wilson, Francis Manly,	Ithaca,	*Optional*

IN THE SECOND YEAR OR SOPHOMORE STUDIES.

Adams, Ewing Hildreth,	Cleveland, O.	*Optional*
Aldrich, Pliny Sexton,	Palmyra,	*Mechanic Arts, Opt.*
Bacon, Charles Putnam,	Hartford, Ct.,	*Philosophy*
Bailey, Henry,	Caughdenoy,	*Science*
Baker, George Titus,	Iowa City, Ia.,	*Engineering*
Bakes, Robert Owen,	Vevay, Ind.,	*Agriculture*
Barros, Francisco Fernando de	S. Paulo, Brazil,	*Engineering*
Bissinger, William,	New York City,	*Optional*
Bonney, Alfred,	New York City,	*Agriculture*
Buchman, Albert,	New York City,	*Architecture*
Caldwell, Frank,	New York City,	*Agriculture*
Cane, Abraham,	Plattsburgh,	*Optional*
Chase, David Austin,	Jeffries, Pa.,	*Optional*
Chandler, Walter,	Weldon, Ill.,	*Optional*
Coffin, Harold Lewis,	Manchester, Eng.	*Optional*
Cole, Emma Jane,	Lowell, Mich.,	*Optional*
Conde, Mary Frances,	Amsterdam,	*Philosophy*
Congdon, Lenore,	Oberlin, O.,	*Literature, Opt.*
Corbett, Flora Josephine,	Clayville,	*Literature*
Cornell, Elizabeth Percival,	Willow Creek,	*Science*
Cornish, Albert Judson,	Hamburg. Ia.,	*Optional*
Craig, Josie,	Canton, Ill.,	*Science*
Cummings, Frederic Douglas,	Tully,	*Science*
Davidson, Charles Parker,	Waverly, Pa.,	*Agriculture*
Demorest, Henry Clay,	New York City,	*Science*
Dounce, George Alexander,	Elmira,	*Arts, Opt.*
Falkenau, Arthur,	New York City,	*Mechanic Arts*
Ferguson, Nicholas Ephraim,	Stockholm, N. J.,	*Engineering*
Fleischman, Adolph,	Albany,	*Architecture*
Fleming, Minnie Miranda,	Ithaca,	*Literature*
Foote, Hubert Townsend,	New York City,	*Science*
Gamewell, Francis Dunlap,	New York City,	*Engineering*
Gelatt, Roland Bernard,	Keokuk, Iowa,	*Literature, Opt.*

Gibson, Stanford Jay,	South New Berlin,	*Science*
Giddings, Lizzie Jane,	Jefferson, O.,	*Literature*
Gifford, Harold,	Milwaukee, Wis.,	*Natural History*
Gokey, William Noah,	Addison,	*Science, Opt.*
Gould, Charles Asahel,	Newtonville, Mass.,	*Arts, Opt.*
Green, Hattie Lucina,	South Byron,	*Science*
Gregory, Emily Lovira,	Buffalo,	*Optional*
Gregory, Edgar Warren,	Palmyra,	*Mechanic Arts*
Gutheim, Meyer,	New Orleans, La.,	*Literature*
Haight, James Augustus,	Oshkosh, Wis.,	*Arts*
Hallowell, Charles Edward,	Philadelphia, Pa.,	*Chemistry*
Hamilton, John Foster,	New York City,	*Architecture*
Haskell, Eugene Elwin,	Forestville,	*Engineering*
Hathaway, Arthur Safford,	Decatur, Mich.,	*Science*
Hicks, Margaret,	Syracuse,	*Architecture*
Hinkley, Charles Watson,	Chicago, Ill.	*Science*
Hostetler, Virgil Newland,	Nopa City, Cal.,	*Philosophy, Opt.*
Howland, Edward Cole,	Poughkeepsie,	*Literature*
Hoxie, Susan,	Scipioville,	*Agriculture*
Hurn, John Matthew,	Philadelphia, Pa.,	*Optional*
Ingalls, Willis Arnold,	Peterboro,	*Science*
Jackson, Caroline Cooke,	New York City,	*Philosophy*
Jackson, Marcellus Cartright,	Delhi,	*Science, Opt.*
Johonnot, Marion,	Deposit,	*Optional*
Kane, Michael Nolan,	McLean,	*Optional*
Kennedy, James Carroll,	Troy, Vt.,	*Engineering*
Kent, Robert Streator,	Bay Ridge,	*Science*
Kerr, Walter Craig,	St. Peter, Minn.,	*Mechanic Arts*
Kimball, Alice,	Davenport, Iowa,	*Optional*
King, Franklin Hiram,	Whitewater, Wis.,	*Natural Hist., Opt.*
King, Henry Wilson,	North Brookfield, Mass.,	*Optional*
King, William Walter,	Warren, Ohio,	*Mechanic Arts*
Knapp, Charles Langdon,	Lowell, Mass.,	*Architecture*
Kozima, Noriyuki,	Tokio, Japan,	*Architecture*
Kratz, Oliver Swartley,	Chalfont, Pa.,	*Science*
Lafee, Mark Harry,	Dayton, Ohio,	*Architecture*
Lehman, Sigmund Mayer,	New York City,	*Science*
Logan, Kate Tappen,	Morristown, N. J.,	*Philosophy*
Lowenbein, Ernest,	New York City,	*Architecture*
Lucas, Charles Otho,	Greenville, Ohio,	*Science*
Ludeling, Frederick Lyndhurst,	Monroe, La.,	*Philosophy, Opt.*

Macy, Ervin Barnes,	Port Byron,	*Science*
Magner, Edmund,	Andover,	*Science*
Mason, John Park,	Brooklyn,	*Optional*
McDermid, Henry Angus,	Hillsdale, Mich.,	*Mechanic Arts*
McEwan, James Fraser,	Bay City, Mich.,	*Engineering*
McGraw, Joseph Willis,	Ithaca,	*Science*
McKay, Charles Leslie,	Appleton, Wis.,	*Natural History*
Mersereau, Charles Vernon,	Union,	*Engineering*
Millard, Alfred,	Omaha, Neb.,	*Science*
Miller, Henry Eugene,	White's Valley, Pa.,	*Science*
Mills, Hattie May,	Syracuse,	*Literature*
Moffat, Edmund Judson,	Chatham,	*Literature*
Montignani, John Ferguson,	Albany,	*Literature*
Morris, David Ellis,	Cincinnati, Ohio,	*Arts*
Morse, Everett Fleet,	Ithaca,	*Engineering*
Morse, Edmund Royce,	Rutland, Vt.	*Literature, Opt.*
Newton, Whitney Treat,	Denver, Col.,	*Science*
O'Connell, John Richard,	Barrytown,	*Engineering*
Olmsted, Allen Seymour,	Leroy,	*Literature*
Olney, Willard,	Westernville,	*Engineering*
Page, John,	Stafford,	*Engineering*
Parke, Robert Augustus,	Binghamton,	*Mechanic Arts*
Patten, Elsie Belle Mandeville,	Binghamton,	*Literature*
Peck, Lyra Rosalind,	West Bloomfield,	*Science*
Phelps, Sara Ledora,	Princeton, Ill.,	*Optional*
Philipp, William Bernard,	Cincinnati, Ohio,	*Science, Opt.*
Pierce, Charles Edwin,	Buffalo,	*Science*
Porter, Luther Henry,	East Orange, N. J.,	*Agriculture*
Randolph, Nathaniel Archer,	Chadd's Ford, Pa.,	*Optional*
Rich, Edson,	Binghamton,	*Optional*
Russel, Edward	Ithaca,	*Arts*
Russel, Sarah Jackson,	Ithaca,	*Literature*
Sawyer, Seth Hasty,	Bangor, Me.,	*Optional*
Severance, Frank Hayward,	Whitewater, Wis.,	*Science*
Shearer, Chauncy Hurlbut,	Bay City, Mich.,	*Science*
Sheldon, Herbert Paris,	Perry Centre,	*Natural History*
Simons, Seward Adams,	Buffalo,	*Arts*
Simpson, George Frederic,	Lodi,	*Engineering*
Skinner, Frank Woodward,	Brownville,	*Engineering*
Smith, Fred Elias,	Scipio,	*Science*
Smith, William Joseph,	Charleston,	*Engineering*

Spaulding, Moses Jay,	East Poultney, Vt.,	*Science*
Spofford, Harry Wiltsie,	Washington, D. C.,	*Literature, Opt.*
Stead, Henry Howard,	Salisbury Mills,	*Literature*
Strickler, Robert Mann,	Philippi, W. Va.,	*Optional*
Suren, Nathan Hagop,	Marash, Asia Minor,	*Mechanic Arts*
Thiemeyer, Herman Louis,	Baltimore, Md.,	*Engineering*
Tidball, John Satterlee,	Fort Monroe, Va.,	*Science*
Tidball, Walton Caldwell,	Fort Monroe, Va.,	*Chemistry*
Tomkins, Calvin,	Newark, N. J.,	*Science*
Van Horne, Lewis Cass,	Zanesville, O.,	*Optional*
Van Wormer, Eve Emma,	Glenville,	*Science*
Warner, James Ward,	Rock Stream,	*Philosophy*
Washburn, Alfred,	Chappaqua,	*Science*
Weed, Addison,	North Rose,	*Engineering*
Weed, Mary Elizabeth,	North Rose,	*Literature*
Weinmann, John Henry,	St Johnsville,	*Natural History*
Welles, George Matson,	Elmira,	*Science*
White, Howard Ganson,	Syracuse,	*Science*
Whiton, Frederic Jeffrey,	Ithaca,	*Arts*
Wilcox, Frank Nelson,	Ithaca,	*Architecture*
Williams, Gershom Mott,	Newburgh,	*Science*
Wilson, Duncan Campbell,	Beaufort, S. C.,	*Engineering*
Wright, Frank Ayres,	Newburgh,	*Architecture*
Wright, William Terry Jackson,	Chicago, Ill.,	*Science*
Wyckoff, Edwin Morton,	Perry,	*Optional*
Youmans, Charles,	Winona, Minn.,	*Science*
Young, John Henry Weir,	Cold Spring,	*Natural History*

IN THE FIRST YEAR OR FRESHMAN STUDIES.

Abel, Frank Warner,	Owego,	*Science*
Alberti, William Maxson,	New Market, N. J.,	*Science*
Allison, Charles Rollo,	Oswego,	*Science*
Arnold, Bishop,	Rochester,	*Mechanic Arts*
Arnold, George,	Rochester,	*Science*
Arrigunaga de, Joaquin Gutierez,	New Orleans, La.,	*Agriculture*
Atwood, Charles,	Moravia,	*Agriculture*
Atwood, Charles Edwin,	Ithaca,	*Science*
Babcock, Charles Edward Payne,	Manlius,	*Mechanic Arts*

Bacon, James Edward,	Riverside, Ct.,	*Science, Opt.*
Baker, William Apollos,	Yaphank,	*Science*
Barros-Paes, Fernando de,	S. Paulo, Brazil,	*Engineering*
Barto, Edmund Charles,	Jacksonville,	*Optional*
Baxter, Frank Edward,	St. Louis, Mo.,	*Mechanic Arts*
Beckwith, John Dorr,	Cedarville,	*Engineering*
Benham, George Washington,	Norwalk, O.,	*Literature*
Bird, William Noble Davis,	Ithaca,	*Agriculture*
Birney, William Ver Plank,	Washington, D. C.,	*Engineering*
Bissell, Esse Clarissa,	South Bend, Ind.,	*Science*
Blake, Charles Willis,	Waterport,	*Optional*
Bliss, Henry Dwight,	Holley,	*Agriculture*
Bonney, Jerome Rapalje,	New York City,	*Science*
Bouck, Hager,	Mineral Springs,	*Science*
Boyer, Arthur Grindage,	Aurora,	*Natural History Opt.*
Bradley, Willis Clifford,	Cedar Rapids, Iowa,	*Science*
Brown, Dewitt Clinton,	Sandusky, O.,	*Science*
Brown, Henry Kirk,	Syracuse,	*Literature*
Buck, Helen Albertian,	Watkins,	*Science*
Buckley, William Doubleday,	Unadilla,	*Optional*
Burger, Edward Henry,	Brooklyn,	*Agriculture*
Busch, George Hamson,	Ellenville,	*Science*
Cady, Daniel Stanton,	Clintonville,	*Mechanic Arts*
Caine, John Thomas, Jr.,	Salt Lake City,	*Agriculture*
Carpenter, Charles Raymond,	Leavenworth, Kan.,	*Nat. Hist., Opt.*
Carpenter, George,	Utica,	*Natural History*
Carrier, William Harvey,	Phœnix,	*Agriculture*
Cary, Elgin Bruce,	Boston,	*Science*
Chamberlin, John Calvin,	Cannonsville,	*Science*
Clements, Gabrielle Devaux,	Philadelphia, Pa.,	*Natural History*
Cobb, Fred. Carlton,	Andover.	*Philosophy*
Coffin, John,	Genoa, Neb.,	*Mechanic Arts, Opt.*
Cole, George Willard,	Troy,	*Mechanic Arts*
Conklin, Henry Sisson,	Poughkeepsie,	*Literature*
Cook, Charles Button,	Buffalo,	*Engineering*
Cooke, Edwin Stephens,	Washington, D. C.,	*Science*
Cramphin, Harry Alexander,	Morrisville,	*Science*
Curtis, Frank Smith,	Moravia,	*Engineering*
Curtiss, Edward Whitehead,	Whitewater, Wis.,	*Mechanic Arts*
Davis, Levi Sheldon,	Greenwood,	*Optional*
DeCamp, Clarence Addington,	Towerville, N. J.,	*Science*

Drake, Jeremiah Clinton Merle,	Westfield,	*Natural History, Opt.*
Dutcher, John Benjamin,	Red Creek,	*Literature*
Dutton, Chauncey Noble,	Washington, D. C.,	*Engineering*
Dwight, Annie Amelia,	Dryden,	*Science*
Eberman, Frank Potts,	Strasburg, Pa.,	*Science*
Eggleston, Trowbridge,	Gaines,	*Engineering*
Farquhar, Richard Henry,	Little Rock, Ark.,	*Optional*
Finch, William Albert,	Ithaca,	*Arts*
Fishel, Frederic Eugene,	Patchouge,	*Literature, Opt.*
Flannigan, John Richard,	Binghamton,	*Arts*
Forbes, Lewis Eugene,	Mayville, Wis.,	*Philosophy, Opt.*
Force, Lafayette,	Tekama, Neb.,	*Science*
Fox, Walter Howard,	Portland, Me.,	*Agriculture*
Frear, Lewis Baltus,	Ithaca,	*Science*
Freeman, George Wiley,	Dover, N. H.,	*Engineering*
Gardner, William,	Syracuse,	*Science*
Garlock, William Delano,	Little Falls,	*Natural History*
Gaunt, Thomas Townsend,	Poughkeepsie,	*Optional*
Gifford, George Francis,	Jamestown,	*Science*
Gillig, Harry,	Virginia City, Nev.,	*Science*
Goodwin, DeWitt,	Dresserville,	*Literature, Opt.*
Gould, George Benjamin,	Ithaca,	*Chemistry*
Gregg, Arthur Samuel,	Ithaca,	*Mechanic Arts*
Griffith, William Ross,	Brooklyn,	*Natural History, Opt.*
Halpen, Annie Marie,	Albany,	*Optional*
Hamilton, Justus Albert,	Ottumwa, Ia.,	*Science*
Hamrick, Jesse Davis,	Belleville, Ind.,	*Science, Opt.*
Haskell, George Frederick,	Albany,	*Science*
Haskin, Hiram Lowe,	Ithaca,	*Mechanic Arts*
Havens, Rodman Wesley,	Ellenburgh,	*Engineering*
Hawkins, Carlton Richmond,	East Hamburg,	*Engineering*
Hayes, Rutherford Platt,	Fremont, O.,	*Science*
Haynes, Leonard,	Brownsville, Texas,	*Engineering*
Henry, William Arnon,	Defiance, O.,	*Agriculture*
Herring, James Simms,	Mt. Olive, N. C.,	*Mechanic Arts*
Hill, Henry Benjamin,	Rome,	*Literature Opt.*
Hill, Lena Lilian,	Isle La Motte, Vt.,	*Philosophy, Opt.*
Hills, Harold Edwards,	Auburn,	*Optional*
Hough, Romeyn Beck,	Lowville,	*Optional*
Hoxie, Nathaniel,	New York City,	*Engineering*
Hull, Carrie Lydia,	Forestville,	*Philosophy*

Humphrey, Charles,	Ithaca,	*Science*
Huntley, Willis Arnold,	Troy,	*Literature*
Hutchins, Albro Warner,	Ithaca,	*Agriculture*
Irvine, Frank,	Sharon, Pa.,	*Science*
Jackson, William Erastus,	Wilmington, Del.,	*Architecture*
Jennings, Jay James,	Norwalk, O.,	*Literature*
Jennings, Thomas Ellis,	Brasher Falls,	*Architecture*
Johnson, John William,	Jefferson, Wis.,	*Agriculture*
Johnston, William Eugene,	Cooperstown,	*Arts*
Jones, Frank Henry,	Trumansburg,	*Science*
Kelley, Florence Wolthrop,	Germantown, Pa.,	*Literature*
Kelley, Irving Washington,	Kelley's Island, O.,	*Mechanic Arts*
Kelley, William Datus,	Kelley's Island, O.,	*Mechanic Arts*
Kendig, John Landon,	Waterloo,	*Philosophy*
Knapp, James Louis,	Union,	*Literature*
Kuppenheimer, Philip,	New York City,	*Science*
Lathrop, Oscar Garland,	Ackworth, N. H.,	*Science*
Lawrence, Frederick Cross,	Minneapolis, Minn.,	*Science*
Leary, James Thomas,	Ithaca,	*Science*
Leighton, Herbert Jackson,	Ithaca,	*Engineering*
Lemen, James Arthur,	Dansville,	*Optional*
Longstreth, Morris,	Germantown, Pa.,	*Mechanic Arts*
Lovelace, Frederic Lauren,	Dundee,	*Philosophy*
Lyon, Frank,	Binghamton,	*Optional*
Mack, George William,	Ithaca,	*Mechanic Arts*
Manierre, Charles Edward,	Chicago, Ill.,	*Natural History*
Mann, Gustav Marcus,	Milwaukee, Wis.,	*Agriculture*
Mason, Milo Leland,	Newton Centre, Mass.,	*Arts, Opt.*
Marsh, Daniel Eugene,	Ithaca,	*Optional*
Martin, Andrew Richey,	Alleghany City, Pa.,	*Science*
Marx, Henry,	Toledo, O.,	*Mechanic Arts, Opt.*
McChesney, Joseph,	Troy,	*Optional*
McClumpha, George,	Amsterdam,	*Science*
McCorn, William Alfred,	Newfield,	*Natural History, Opt.*
McDougall, John,	Hornellsville,	*Mechanic Arts*
McKinstry, Charles Herbet,	Canajoharie,	*Chemistry*
McNeil, Estelle,	Owego,	*Literature*
Mendes, Octaviano Abdon Pereira de,	S. Paulo, Brazil,	*Engineering*
Merry, Addison Delavan,	Phœnix,	*Science*
Mesick, David Wilson,	Kinderhook,	*Engineering*
Mesick, Frederick Peter,	Kinderhook,	*Engineering*

Messenger, Hiram John,	Cortland,	*Literature*
Mills, Arthur Eugene,	New York City,	*Architecture*
Morris, Edward Romeo,	Fort Wayne, Ind.,	*Optional*
Morris, Robert Tuttle,	New Haven, Ct.,	*Natural History*
Morrison, John Trowbridge,	Nyack,	*Engineering*
Moulton, Guy,	Cicero,	*Optional*
Munson, George,	New York City,	*Architecture*
Niles, Silas West,	Hornellsville,	*Science*
Norton, Henry Mark,	New York City,	*Agriculture*
Norton, James Eddy,	Belmont,	*Literature*
Nourse, Clinton Lafayette,	Rushville, Ohio,	*Optional*
O'Brien, Michael John,	Bergen,	*Science*
Ogden, Charles Edwin,	Penn Yan,	*Science*
Olmsted, Charles,	Tarrytown,	*Science*
Ormsby, Frank Worden,	Oswego,	*Engineering*
Otis, George Franklin,	Boston, Mass.,	*Mechanic Arts*
Otis, Philip Arthur,	Leeds, Mass.,	*Mechanic Arts*
Outram, Thomas Sidney,	Easton, Md.,	*Agriculture*
Palmer, Nettie Amelia,	Ithaca,	*Natural History*
Parmenter, Syrel,	Cohocton,	*Optional*
Parsons, Frank Hall,	Montclair, N. J.,	*Agriculture*
Passmore, Sarah West,	Street Road, Pa.,	*Science*
Pearson, Ida Florence,	Plainfield, N. J.,	*Natural History*
Peck, William Dayton,	Cortland,	*Philosophy*
Pennock, Charles John,	Ithaca,	*Agriculture*
Phelps, Susanna Stuart,	Morrisville,	*Literature*
Pierson, Charles Bertram,	Canandaigua,	*Literature*
Pomeroy, Standish Barry,	Herkimer,	*Literature*
Poole, Murray Edward,	Smithboro,	*Arts, Opt.*
Porter, Eugene,	Ghent,	*Philosophy*
Ratliff, Barclay,	Friendswood, Ind.,	*Natural History*
Robinson, Hinman Smith,	Union Springs,	*Science*
Rose, Alice Evelyn,	Cleveland, O.,	*Science*
Rudd, Willis Nathaniel,	Ithaca,	*Natural History*
Ruditch, Pineas,	Odessa, Russia,	*Agriculture*
Rumpf, William Henry August,	Newark, N. J.,	*Mechanic Arts*
Russel, Willliam Channing, Jr.,	Ithaca,	*Arts*
Ryder, Clayton,	Carmel,	*Science*
Sanger, Edward Berry,	Rockville Centre,	*Natural History*
Scott, Frank Jeremiah,	Jordan, Minn.,	*Mechanic Arts*
Sexton, Allan Farnham,	Ithaca,	*Optional*
Shackford, Lucy Bartlett,	Ithaca,	*Literature*

Sheldon, Charles Stiles,	Oswego,	*Natural History*
Sheldon, Frances Elizabeth,	Oswego,	*Architecture*
Shepard, Fred Douglas,	Malone,	*Engineering*
Sinclair, Henry Harbinson,	New York City,	*Science*
Slauson, Allan Bedinet,	Weedsport,	*Philosophy*
Smith, Cornelia Delap,	Cambridge, Mass.,	*Arts*
Smith, Caro Lincoln,	Cambridge, Mass.,	*Arts*
Smith, Frederick William,	Ithaca,	*Arts*
Smith, Robina Silsbee,	Cambridge, Mass.,	*Arts*
Snyder, Harry Wilson,	Freeport, Ill.,	*Agriculture*
Soule, Henry Howard,	Syracuse,	*Literature*
Stanton, Robert Livingston,	Tenafly, N. J.,	*Optional*
Sweet, Carol Lincoln,	Phœnix,	*Natural History, Opt.*
Sweeting, Mary Anna,	South Butler,	*Optional*
Tallman, Frank Gifford,	Syracuse,	*Mechanic Arts*
Taylor, Marvin Albert,	Ithaca,	*Science*
Terrell, Henry,	Ithaca,	*Optional*
Terry, Edmund Burke,	Waterville,	*Science*
Thomas, Frank Salter,	Bay Ridge,	*Science*
Tiffany, Frank Giles,	Gainesville,	*Science*
Tiffany, Joseph Burr,	Coxsackie,	*Mechanic Arts, Opt.*
Tilton, John Neal,	Rome, Italy,	*Architecture*
Tilton, Paul Henry,	Rome, Italy,	*Mechanic Arts*
Tracy, Aurelius Milford,	Ghent,	*Philososhy*
Trainer, John Walter,	Steubenville, O.,	*Literature, Opt.*
Tree, Thomas,	Ithaca,	*Science*
Trelease, William,	Brooklyn,	*Natural History*
Trump, Edward Needles,	Wilmington, Del.,	*Mechanic Arts*
Turner, Samuel Bates,	Ithaca,	*Literature*
Underhill, Isaac Morse,	Norwalk, O.,	*Literature*
Upjohn, Richard Russell,	Brooklyn,	*Engineering*
Vail, Alfred Tennyson,	Chester,	*Science*
Vance, Lee James,	Penn Yan,	*Science*
Wagner, Charles Gray,	Whitesboro,	*Natural History*
Waterbury, John Calvin,	Rensselaerville,	*Mechanic Arts*
Webster, Hosea,	Oyster Bay,	*Science*
White, Fred Davies,	Ithaca,	*Science*
White, Henry,	Ithaca,	*Arts, Opt.*
White, Seward,	West Township,	*Engineering, Opt.*
Whitney, Frank Curtis,	West Danby,	*Arts*
Wieder, Moses Leon,	Little Rock, Ark.,	*Optional*

Wilcox, Nellie,	Ithaca,	*Literature, Opt.*
Wilhelm, Henry Walter,	Toledo, O.,	*Engineering*
Williams, Ella Cornelia,	Watkins,	*Literature*
Williams, Henry Kirk,	Dunkirk,	*Chemistry*
Wing, Albert John,	Albany,	*Science*
Wise, Otto Solomon,	New York City,	*Science*
Woolworth, Amulet May,	Turin,	*Science*

SUMMARY BY YEARS.

Post Graduates	23
In Senior or Fourth Year Studies	84
In Junior or Third Year Studies	90
In Sophomore or Second Year Studies	141
In Freshman or First Year Studies	223
Undergraduates	538
Total in the University,	561

SUMMARY BY COURSES.

Arts	33
Literature	51
Philosophy	29
Science	147
Agriculture	29
Architecture	29
Chemistry and Physics	12
Civil Engineering	70
Mechanic Arts	54
Natural History	29
Optional	55
Total of Undergraduates	538
Post Graduates	23
Total	561

THE CORNELL UNIVERSITY.

GENERAL VIEW.

FOUNDATION.

The existence of the Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell. On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge of tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts, amounting to several hundred thousand dollars.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation" and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based.

In accordance with the requirements of its charter, the Institution was duly opened on the seventh of October, 1868.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868-69—provides for the support and maintenance of colleges, "where," in the language of the Act, "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches as are related to Agriculture and the Mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated.

THE UNIVERSITY AND THE STATE.

The Act of Incorporation after citing the words of the Congressional Act (declaring the leading purpose of the land grant), adds: "And such other branches of Science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University as the Trustees may deem useful and proper."

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students.

The Trustees of the University have placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four for each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of nearly forty thousand dollars *per annum*.

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Technical Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, or Natural History; or he may, subject to the approval of the Faculty, take an *Optional Course*, under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. No student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which might otherwise occur,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to consult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University; otherwise the student will be compelled to wait and thus lose one year of his scholarship. The successful candidate is subject to the usual entrance examination on arriving at the University. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-three. Of these, the eldest son of the Founder is, by the law of the State, a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of

Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, holds frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings, a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the supervision of the various courses of study, and such duties as generally appertain to an academic Faculty. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties:

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient and Asiatic Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History. Each of these Faculties have special charge of the studies in some one or more of the General Departments of study.

TERMS AND VACATIONS.

The Academic Year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring Recess, consisting of only three academic days, begins at noon of the Friday next after the twenty-third day of March.

The Spring Term begins on the Tuesday next after the twenty-second day of March, and the instruction for the term begins on the Thursday following, and continues until Commencement, making in all thirty-seven weeks of term-time in the academic year.

For the beginning and ending of terms and vacations of each year, and other matters of detail relating to them, see the Calendar, p. 7 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince misapprehension in regard to its plan and organization. This has rendered the subjoined statements necessary :—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactorily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students from any State or country.* Free instruction for undergraduates, is given only to State Students and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York. But all others are received, whatever may be the State or

country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows :—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers*, some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which result from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

3. *The Prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

RELIGIOUS INSTRUCTION.

The University was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view. It would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

In the University Chapel—the gift of Henry W. Sage—religious services are held, in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. These discourses are delivered during the first and third terms of each year, and usually two on each Sunday.

HIGHER EDUCATION OF WOMEN.

It was the wish of the Founder and other influential friends of the University, from the first, that it should be open and its means and facilities for education should be offered to all, irrespective of sex, color, or nationality. And by an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building—the Sage College for Women has been completed and is in readiness for use. There is no separate Course or Department for women students, the Entrance Examinations are the same for them as for the young men and depend upon the course they intend to pursue. Neither are there any separate classes formed for them, the only distinction made is, that a separate building has been provided by the liberality of Mr. Sage for them to live in, if they choose to avail themselves of the opportunity. While the leading object of the movement is perhaps to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course, those who have been chiefly instrumental in making these arrangements, are earnest believers in the co-education of the sexes.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through academy, college, etc., up to the fullest development of educational resources in a well endowed and completely

equipped university, with its technical departments for the useful Arts and its professional schools for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate Degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate Degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its professors, are placed at the service of its own graduates, and of the graduates of like standing from other colleges and universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they have occasion to use in the prosecution of their studies and investigations. Already quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate professor or Special Faculty.

SELF-SUPPORT BY STUDENTS.

Young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and in a very few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. Self-

support, to any extent, requires energy, persistence and sacrifice; and even a skillful mechanic should have some means in reserve, so that his energies in the University will not be diverted from mental to manual labor. Most of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work; but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. The number of young men applying for such labor has constantly exceeded the number that the University is able to employ; and it must be distinctly understood that the University will not *guarantee employment to any student.*

THE UNIVERSITY TOWN.

Ithaca, the seat of the University, is a town of about ten thousand inhabitants, situated at the head of Cayuga Lake, in Tompkins County, New York. It is accessible from the East, South and West by means of the Erie Railway, leaving that road either at Owego, thence to Ithaca by the Ithaca branch of the Delaware and Lackawanna Railway, or at Waverly, from which place the Ithaca and Athens Railroad leads to Ithaca; or passengers can leave at Elmira, and come directly to Ithaca. From the North there are three roads that leave the New York Central (Auburn Branch), one at Geneva, one at Cayuga Bridge, and the third is the Southern Central, which leaves at Auburn, and crosses the Ithaca and Cortland Road at Freeville. Or persons may leave the New York Central at Syracuse, and reach Ithaca by way of Cortland. The Ithaca and Cortland Railroad starts from the immediate vicinity of the University buildings, and connects with the Southern Central Railroad at Freeville, a distance of nine miles, and with the Syracuse and Binghamton Railroad at Cortland, a distance of twenty miles from Ithaca; in the former case reaching the New York Central Railroad at Auburn, and in the latter at Syracuse.

SCOPE OF THE INSTRUCTION.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words:—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

The instruction given in the University is distributed into several Departments, some of which are subdivided into Schools; and out of these Schools and Departments there are made up four General Courses and six Technical or Special Courses, as will be seen more fully below under the head of "Courses of Study."

I. DEPARTMENT OF AGRICULTURE.

The simple requirements for admission to the Course in Agriculture put the advantages which it offers within the reach of every enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in Agriculture before any others who may wish for this work.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the

class-room exercises, the student devotes as much time as can be profitably spared for the purpose, to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

Students in the Department of Agriculture enjoy, in common with all members of the University, the privilege of using the University Library, and of attending any lectures given in the University.

In Practical Agriculture five hours weekly during the senior year are devoted to technical instruction; this time being divided between lectures, reviews, agricultural calculations and farm accounts. Besides this the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

Tuition is *free of charge.* Room-rent may be remitted, at the discretion of the Faculty, provided the student is at the same time doing a reasonable amount of work on the farm to help defray other expenses.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas' "American Fruit Culturist;" Kent's "Landscape Gardening."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Anderson's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius' "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening."

VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:—1. Five lectures a week extending over the entire academic year. 2. Laboratory work on the bones, skeletons,

clastic models, pathological preparations, and parasites of the domestic animals. 3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm, the various systems of organs and functions being taken up in turn and the differences pointed out together with the bearing of these variations on their healthy management and diseased processes. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses, such as draught, speed, endurance, early maturity and propensity to fatten, milking qualities, etc.; to the data for determining the age; to the principles of breeding, of shoeing, etc.

The Second Term is appropriated to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals and of veterinary surgery. The general principles which must guide in all surgical manipulations are stated, the various operations practiced on the domestic animals are described, and these are illustrated when suitable subjects present themselves.

In Veterinary Science an opportunity is afforded to students who desire it, to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study of the School.

Text-Books.—Chauveau's "Comparative Anatomy of the Domestic Animals;" Colin's "Physiologie des Animaux Domestiques;" Marshall's Outlines of Physiology;" Law's "Principles and Practice of Veterinary Medicine and Surgery."

Books of Reference.—Leyh's "Handbuch der Anatomie der Hausthiere;" Gamgee and Law "Anatomy of the Domestic Animals;" Stephen and Seller "Physiology at the Farm;" Goodale's "Breeding;" Low's "Domesticated Animals;" Gamgee's Domestic Animals in Health and Disease;" Percivall's "Hippopathology;" Williams' "Principles and Practice of Veterinary Medicine and Surgery;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Baumeister's "Geburtshülfe;" Rainard's "Parturition;" Delwart's "Parturition;" Fleming's "Veterinary Sanitary Science

and Police;" Reynal's "Traité de la Police Sanitaire;" Miles "On the Foot;" Rey's "Marechalerie;" Bouley and Reynal "Dictionaire de Médicine Vétérinaire."

II. ARCHITECTURE.

The course of study in Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Faculty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practiced in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Any student may attend the lectures on building materials and construction; but, with these exceptions, all students entering the department will be required to pursue the regular course of study, prescribed for the Degree of Bachelor of Architecture.

III. CHEMISTRY AND PHYSICS.

I. SCHOOL OF CHEMISTRY AND MINERALOGY.

The instruction in chemistry begins with the lectures on general chemistry in the second term of the Sophomore year. During that and the succeeding term three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. In addition to the final examination at the end of each term occasional examinations are held during the term of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times. During the first term of the Junior year a course of lectures will be given on the chemistry of organic bodies; it will be restricted to the consideration of the more frequently occurring bodies of organic origin, which the student is constantly meeting in his every-day life.

The Introductory Chemical Practice may be taken in the second Sophomore term, but is required of all students in the

Special Course in Science in the third term. This practice consists in the performance by the student of a series of experiments contrived and arranged for the illustration of the more important general principles of chemistry, as well as for the cultivation of his powers of observation; while the details of the manipulation of each experiment are carefully described, the student is required to observe the results for himself and trace their connection with the principle illustrated.

The Special Chemical Course.—This is arranged for those desiring to accomplish as much as possible during the four years of a college course towards fitting themselves for the profession of chemistry. It includes, besides some study of other sciences, of mathematics, and French and German, attendance on lectures on general, organic, technical, and analytical chemistry, and a course of practice in qualitative analysis, including blow-piping, and in quantitative analysis, including assaying, the analysis of ores and minerals in the wet way, of organic substances, waters, gases. articles of food, etc.

Agricultural Chemistry.—This comprises a course of lectures on the chemistry of the elementary and compound substances concerned in the growth of plants and animals, the chemistry of vegetable and animal life, of soils and manures, and of agricultural technology. The laboratory practice, except in the full course of four years, is confined to the qualitative and quantitative analysis of such substances as may be met with in the course of ordinary agricultural practice, and requires from four hundred to four hundred and fifty hours for its completion.

Chemical Technology.—A course of lectures is given, in the third terms of two successive years, on the applications of chemistry in the arts and industries. It will embrace the study of the chemical principles involved, and of the manipulation required, in the commercial preparation of acids, alkalies, salts, fats, oils, soaps, coal gas, coal tar, coloring matters, glass, pottery, mortars, textile fabrics, leather, paper, etc. The course will be supplemented by excursions to such mills and manufactories as are accessible, and by special laboratory practice in the detection of adulterations, and the valuation of commercial samples.

Medical Chemistry.—This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Course in blow-piping.—This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work,

when it becomes necessary to make out the character of a rock or mineral.

Metallurgy and Mineralogy.—Two lectures a week are devoted to each of these subjects, in alternate years; a certain amount of laboratory work is required in connection with the lectures on Mineralogy.

Admission to the Laboratory without Entrance Examinations.—Persons not under twenty years of age may be admitted to the practice of qualitative or quantitative analysis without passing the entrance examinations for admission to the University, on giving satisfactory evidence of their competency to undertake such a course of study, and agreeing to confine themselves to it exclusively.

Laboratory Expenses.—Students in the laboratory will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices. They will be required to make a deposit with the Treasurer of a small sum to cover these charges, before beginning work in the laboratory, except when delay is allowed by special permission of the professor in charge.

Text books and works of reference.—Thorpe, "Inorganic Chemistry;" Barker, "College Chemistry;" Caldwell and Breneman, "Introductory Chemical Practice;" Crafts, "Qualitative Analysis;" Fresenius, "Qualitative Chemical Analysis" and "Quantitative Chemical Analysis;" Caldwell, "Agricultural Chemical Analysis;" Elderhorst, "Blow-pipe Analysis;" Kerl, "Probirkunst;" Plattner, "Use of the Blow-pipe;" Sutton, "Volumetric Analysis;" Mohr, "Titrirmethoden;" Thorpe, "Quantitative Chemical Analysis;" Rose, "Chimie Analytique;" Burdon-Sanderson, "Handbook for the Physiological Laboratory;" Storer, "Dictionary of Solubilities;" Gmelin, "Handbook of Chemistry;" Miller, "Elements of Chemistry;" Watts, "Dictionary of Chemistry;" Schorlemmer, "Organic Chemistry;" Wurtz, "Dictionnaire de Chimie;" Graham-Otto, "Lehrbuch der Chemie. Handwörterbuch Chemie."

II. SCHOOL OF PHYSICS.

The instruction in the general course in Physics begins with the first term of the second year and continues six terms, as follows:—

First term.—Mechanics of solids, liquids and gases. Three exercises per week. *Second and third terms.*—Magnetism and electricity. Two exercises per week. *Fourth term.*—Heat. Two exercises per week. *Fifth and sixth terms.*—Acoustics and optics. Three exercises per week.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference:—Atkinson's Ganot's "Physics," Jamin "Cours de Physique" and "Petit Traité de Physique," Müller "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics," Jenkin "Electricity and Magnetism," Maxwell "Theory of Heat" Schellen "Spectrum Analysis."

Besides the above general course, there will be an opportunity for a few students who wish to make Physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course:—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

IV. CIVIL ENGINEERING.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analysis to the solution of engineering investigations, the professional preparation of the students comprises the following subjects:—Free-hand drawing, machine-shop practice, blowpipe analysis of minerals, geology, elementary and structural, metallurgy; the location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The sphere of action of the Civil Engineer is so broad and diversified, that no educated engineer pretends to be equally well prepared in all the various specialties into which the profession has been subdivided by social necessities and common consent. To

meet the loud demand for special engineering studies, efforts will be made from the beginning of the third year of the course, to al-.ow of option and diversity of special studies, so far as the means at our disposal will allow. In this manner this department will foster the development of special fitness among the various classes of students, who by natural inclination may prefer a more or less extended study of any particular branch of Civil Engineering.

The great subdivisions of the work under this department are:—Hydraulic engineering, railroad engineering, bridge architecture and construction, topographical engineering, industrial engineering and mining engineering.

At present we have no more than general facilities for beginning the education of Industrial and Mining Engineers, and we are not prepared to offer superior inducements to students pursuing these important branches as a specialty. Appropriate chairs for this purpose will be created at an early day.

We can offer, however, a complete theoretical and practical course in Civil Engineering, embracing a thorough treatment of the first four great subdivisions enumerated above.

The course in Topographical Engineering is designed for those students who may find distasteful the investigation of the higher mechanics as applied to civil constructions, and who may show, instead, special aptitude for geodetical work. Since the recent great surveying expeditions sent out by the U. S. government took the field, there has been an incessant demand for men specially fitted for the important duties of the explorer and the geographical engineer; and in the work of our well known U. S. Coast Survey, there is also an ample field for the efforts of properly trained geographers and topographers. To provide for this and similar demands, a special course is now in full operation. It is properly manned by efficient instructors and its equipment of general and special instruments has been collected at great expense and is very complete. During their connection with this department students taking the course in Topographical Engineering will have an opportunity to perform work as accurate and extensive as is done in the actual details of the U. S. Coast Survey, and in the geodetic surveys of European governments.

Besides the above, there is a course in Surveying and another course in Draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading, pen and colored topography, machine drawing, and the use of projection tables.

The degree of Civil Engineer is conferred, on the recommendation of this Faculty, upon those who, having taken the Bachelor's degree, shall have spent two years in additional special studies and actual practice, passed the requisite examinations, and presented a satisfactory thesis.

V. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others.

In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history—and thus to enlarge, by careful reference and reading, their acquaintance with the facts presented by the lecturers. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern civilization.

The School of Political Science, is intended to embrace all the important topics connected with political and social science. At present, courses of lectures are delivered, as will be seen below, on political economy and constitutional law.

The following is a list of the lectures given in this department:—(1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2.) Modern history, and the philosophy of modern history, by President White. (3.) The general and constitutional history of England, by Professor Goldwin Smith. (4.) General history, and the philosophy of history, by Professor Wilson. (5.) History of the United States. (6.) American constitutional history, by Professor Dwight. (7.) Political economy, by Professor Wilson.

VI. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

I. SCHOOL OF THE ANCIENT LANGUAGES.

I. THE GREEK LANGUAGE.

FIRST YEAR.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

SECOND YEAR.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Phoenissae); Æschylus (Septem); Aristophanes (Acharnians).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII, and Curtius' History of Greece, books III and IV; Greek philology and composition: Sophocles (Ajax, Oedipus Coloneus): Plato (Protagoras).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from Pindar and Theocritus.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.*—Cicero (Essays and Letters.) *Third Term*—Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*—Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.*—Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

The languages in this school are entirely optional and none of them required for any degree conferred by the University.

In the department of "Hebrew and Oriental Literature and History" instruction will be imparted chiefly by lectures. The main subject of study will be the literature and history of the ancient Hebrews. As, however, experience shows that the national idea of this people cannot be studied to advantage, in its growth and development, without some knowledge of the relations it bears to those eastern nations by which Palestine was surrounded, a preliminary course of lectures will be devoted to a discussion of such other forms of oriental thought and life as are important in this connection.

For a thorough appreciation of any literature a knowledge of the language in which it is written is indispensable. Those who desire to do so will have an opportunity to study the language of the Old Testament under the direction of the professor of the department.

The lectures are delivered twice a week for the present, and only in the Spring and part of the Fall terms. The text-books of the Hebrew class are Deutsch's Hebrew Grammar, and selections from the Hebrew Bible.

In the department of Living Asiatic Languages Prof. Rœhrig presents to his classes, in succession from year to year, grammatical outlines and philological sketches of such languages of the East, as may be most instructive and of particular interest to the student of ethnographical philology and general linguistic science. But no definite course of study has been arranged in any one of the languages included in this school.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the students the principles of grammar and the use of idioms, with a knowledge of pronunciation. so that, at the end of the course, each of them may be able to read any modern work, and to write with some degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term Otto's "French Grammar" is studied. This is completed in the second term, and translation is begun, and is continued through the third term. In the second year French plays are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar; Il "Vero Amica," comedy of Goldoni; Silvio Pellico's "Le Mie Prigoni," and lectures on Italian literature.

Second Year.—Those pursuing a more advanced course will read the "Inferno" of Dante, and attend further lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar in connection with exercises in writing; Moratin's "El Si de Las Niñas," and Cervantes' "Novas Ejemplares."

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year.*—(Second year in the Course in Science). Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. After the second year of German or the third year in the Course of Science, German is optional.

Third Year.—The reading consists of the first part of Goethe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyeson's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

VII. MATHEMATICS AND ASTRONOMY.

In this department there are two courses marked out, one or the

other of which is pursued wholly or in part by every student who is expecting to graduate in any course except Natural History.

The fuller course is designed especially for students in Architecture, Civil and Mechanical Engineering, and those whose professional pursuits are to be largely dependent on Mathematics. It is also designed to meet the wants of those who take the technical course in Mathematics or pursue the subject with special reference to preparing themselves for teachers.

The other course is designed for those who do not intend to pursue the subject any further than is required in the General Courses and in the Courses of Agriculture, and Chemistry and Physics.

FIRST OR FULLER COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Theory of equations and spherical trigonometry. *Third Term.*—Harmonoid geometry and geometrical conics.

SECOND YEAR.—*First Term.*—Analytical geometry. *Second Term.*—Analytical geometry of three dimensions and calculus begun. *Third Term.*—Calculus.

THIRD YEAR.—*First Term.*—Integral calculus. *Second Term.*—Theory of functions and calculus of variations. *Third Term.*—Differential equations.

FOURTH YEAR.—*First Term.*—Analytic and celestial mechanics. *Second and Third Terms.*—Philosophy of mathematics with reviews.

SECOND COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Solid geometry. *Third Term.*—Trigonometry and mensuration.

SECOND YEAR.—*First Term.*—Analytic geometry, plane and solid. *Second Term.*—Calculus and astronomy.

The whole of the first course is required in the Technical Course of Mathematics. It is required through the third term of the calculus ending with the first term of the third year in the Course of Civil and Mechanical Engineering, and through the second term of calculus ending with the third term of the Sophomore year, except the harmonoid geometry, in Architecture.

Any student in any of the courses who chooses to do so may take the mathematics of this course with the permission of the professor in charge of the department.

For post-graduates and special students other subjects are offered if they are desired, as quaternions, quantics and the theory of numbers.

In the latter portions of the fuller course and for post-graduate studies French and German text-books will be used.

Descriptive astronomy will form a part of each course.

Throughout the course in mathematics and in all the mathematical classes there will be frequent examinations during the term, besides the general term examination at the end of each term. These will often be given without notice, and extend to previous work. They will test the student's mastery of general principles and methods, quite as much as of details.

VIII. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial and Practical Mechanics were early established and filled. Models illustrating mechanical movements, and the various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the same purpose. This department has thus been placed in a condition to do its work in a most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine-shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

The instruction in shop practice embraces the study and construction of gearing and link-work, strength and proportion of parts, accurate surfaces (such as face-plates, straight-edges, right angles, etc.), shop accounts, management, etc.

Besides the Full Course of four years, with is given at length

under the heading "Courses of Study" below, two other Courses have been marked out.

An Optional Course under the direction of the Dean. In this course entrance examinations in Grammar, Geography, Arithmetic and Algebra through Quadratics are required.

Attendance upon ten lectures or recitations per week or their equivalent, in addition to two hours daily practice, two hours daily in drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

A Special Course has been arranged for such young men as have a fair knowledge of the machinist's or pattern-maker's trade, who desire to fit themselves for foremen or leading positions in their business. They may enter the department without passing entrance examinations; but they are required to devote at least five hours per day to shop practice and four hours daily to machine or free-hand drawing, and to take such other exercises as may be prescribed by the Faculty of the department.

On leaving the University a certificate of proficiency and attendance will be granted them.

IX. MILITARY SCIENCE.

By the Act of Congress creating the Land Grant on which the University is founded, and by the Act of the Legislature of the State of New York assigning that land grant to us, it is obligatory on the University to provide for instruction in Tactics and Military Science. In accordance with this, Drill and Military Science have been declared to be "a part of the studies and exercises in all courses of study and in the requirements of all students in the University."

The Course of Military Instruction and Drill, now prescribed, extends through the first and third terms of the first, second and third years in the University, and the second term of the fourth year.

These exercises occur not more than three times a week during the first three years, and do not exceed one hour at a time. During the second term of the fourth year they occur but twice a week, and consist mostly of recitations and lectures in reference to the organization and command of a company and battalion.

The Trustees by a resolution of April 23d, 1875, authorized and instructed the Faculty to make such arrangements that any student may substitute other studies and exercises for the Drill and Military Science thus generally required of him.

Under this resolution the Faculty have decided that two recitations a week, or their equivalent in lectures, laboratory work, or other special work in any of the technical courses, for the students of those courses respectively, shall be regarded as an equivalent for the Drill and Military Science for the terms during which they are due.

In order that any student may avail himself of this permission

to substitute something else for the Drill and Military Exercises, it will be necessary that, at the time of obtaining his registration ticket for the term, he shall signify to the Registrar what he intends to offer as a substitute. If he neglects to do so he will be holden to the performance of his military duties for the term.

All students just entering upon the first term of the first year of their course are especially advised to take the Drill instead of offering any substitute for it. The fifteen recitations per week required of them are of such a character that most students find it as much as they can well do to prepare themselves for, and attend to them, while the Drill, requiring no extra study, will be no more than the amount of mere physical exercise which each student will find it necessary to take in some form or other. The practical military exercises are so ordered as to subserve the purposes of physical culture—an object of vital moment during the critical period of life usually comprised within university years.

All students that take Drill must continue it through the term. They are required to provide themselves after the first term of the first year with the University uniform for drill and parade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe, according to the nature of the case.

The Military Exercises include:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable. (3.) *Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Any student who has satisfactorily performed all the duties thus required of him for the first three years, and who is qualified therefor, will be entitled to a commission, and for the performance of his duties as a commissioned officer during his fourth year he will be entitled to a credit of five recitations per week for one term and, at his graduation, will receive, moreover, a certificate of military proficiency together with his appropriate Diploma,

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field

works; military mining; the attack and defense of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

X. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will afford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

1. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany; field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of systematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the princi-

ples involved in the natural system of classification. The prominent species of each order are also considered, especially those of importance as agricultural, medical, economic, or ornamental plants, or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany.

The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany.

In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required.

In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

2. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

In this school a full course may be completed in the last six terms of the course in Natural History; but as this is designed especially for those intending to become professional geologists, ample provision has also been made for the needs of others by the establishment of shorter courses, both special and general.

The instruction given may be classified under three heads:

I. *Geology proper.*—Comprises the principles of general and theoretical geology, including physiography, geognosy, dynamical geology, stratigraphy and archæology. These subjects are taught by means of (1) a course of lectures in the spring term; (2) laboratory practice, consisting in the critical examination of rocks, the study and construction of geological maps, sections, models, etc., and the preparation of short theses upon special topics; (3) field practice, including also the methods of procedure in geological surveys and reconnoissances.

II. *Palæontology.*—In this department, a course of lectures on palæo-zoology is given to special students, in connection with

the study of fossils in the laboratory. Palæo-botany is also taught in a similar manner, the whole being supplemented by the thorough study of historical geology. Field work is required of all students, as in the other branches of the school.

III. *Economic Geology.*—Comprises the distribution and modes of occurrence of mineral deposits; the geological positions and relations of building stones, fictile materials, fossil fuels, light-producers, pigments and other natural accumulations applicable in the arts, as well as the relations of practical geology to agriculture, architecture, civil and mining engineering, sanitary science, etc. These topics are included in a course of lectures given in the winter term, and in the laboratory, special facilities are afforded for further progress to such persons as may desire it. In this way, engineers, architects, physicians and agriculturists may obtain a knowledge of the subject suited to their particular needs.

The lectures are designed to present outline views of the subjects treated, such as will serve as an introduction to higher geological studies, and afford a general idea of the science to those who have not the opportunity of extending their knowledge of it.

In the laboratory, the student is required to investigate for himself, without access to books until he is prepared to use them in the final stages of his studies. Work is systematically laid out by the teacher at each step, and the rate of progress is determined by the ability and faithfulness of the student.

Whenever practicable, extended excursions are made with the classes, and local field work is frequent in suitable weather.

Professor Comstock is now engaged in a geological survey of the hydrographic basin of Cayuga Lake, a district which presents problems of the highest interest in physical geology. Qualified students will assist in this undertaking, receiving full credit for their work.

Courses of study and practice for post-graduate students provide for advanced work in geology or palæontology to any extent that may be desired. The surface geology of this region is remarkable and the rocks of the vicinity are exceedingly rich in fossils of the Devonian age.

3. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3) A course of thirty-five lectures on psychology and æsthetics, by Professor Wilson. In the Winter Term, (1) A course of thirty lectures on general zoology, by Professor Wilder, and (2) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3) A course of fifty lectures upon veterinary medicine

and surgery, by Professor Law. In the Spring Term, (1.) A course of twenty lectures upon comparative anatomy, by Professor Wilder. (2.) A course on economic entomology, by Instructor Comstock. (3.) Lectures on the natural history of man, forming a part of a course in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians are required to dissect, first, the common animals, then monkeys, and afterward human subjects, when they can be procured. Special attention is given to the animals inhabiting Cayuga Lake and the vicinity of Ithaca. Instruction is given in the methods of collecting, preserving and arranging anatomical and zoological specimens.

Books of Reference.—Students are at liberty to select from the following list of works for reading upon the subjects treated of in the lectures:—Flint's "Physiology of Man;" Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's "Physiology and Hygiene." In comparative anatomy—Owen, Huxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies—Wyman ("Symmetry and Homology in Limbs"), Wilder ("Intermembral Homologies.") In zoology—Agassiz ("Essay on Classification," or "Methods of Study in Natural History"), with Tenney ("Manual of Zoology") or Milne-Edwards ("Elements of Zoology"). In economic entomology and ornithology—Packard, Samuels, the New York State Reports, and Riley's Reports on Entomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily pursued a partial or special course, there will be given a certificate, stating the time he has spent, the studies pursued, and his degree of excellence therein. It will be signed by the President of the University and the Dean of the Faculty. A student who has completed the full course of four years, will be recommended for the degree of BACHELOR OF SCIENCE.

XI. PHILOSOPHY AND LETTERS.

I. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of "Wilson's Psychology, Comparative and Human," with lectures.

In the Winter Term of the Junior year the class will have Political Economy.

Spring Term.—Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation. Wilson's "Text-book" will be used with additional lectures and illustrations.

FOURTH YEAR.—*First Term.*—Wilson's "Introduction to the Study of Metaphysics and the History of Philosophy;" with lec-

tures twice a week, on the History of Philosophy and the general progress of human knowledge from the commencement of Greek civilization to the present time.

Second Term.—Moral Philosophy theories or Morals and the development of Moral Sentiments. Dr. Wilson gives lectures also on the Philosophy of History to the Seniors, being a part of the course in "History and Political Science." The lectures occur three times a week, and are intended to explain the rise and progress of civilization, and the causes that have contributed to it.

Third Term.—There is a course of lectures by Dr. Wilson on the American Constitutional and Municipal Law.

2. SCHOOL OF LETTERS.

The study of the English language and literature, including the explanation and illustration of the structure, growth and peculiarities of the language, is incorporated into each of the General Courses.

The School embraces two departments, one of Anglo-Saxon and English Literature, and the other of Rhetoric and General Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, and embraces the following schedule of exercises and lectures:—

In the course in Science:—

No instructions are given by the Professor in this department, until the beginning of the third year.

THIRD YEAR.—*First Term.*—Lectures on the English language and literature, from Chaucer to Milton, inclusive. *Second Term.*—Lectures on the English language and literature, from Dryden to Cowper, inclusive. *Third Term.*—Lectures on English and American literature of the nineteenth century. A Syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric. *Third Term.*—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum,

Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale. Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

II. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and for the first year the instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

During the second year the exercises in writing and composition are continued; the subjects varying with the advance of the student.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; to extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also have exercises in lecturing on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR.—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

SECOND YEAR.—Essays with readings in the class and criticism of composition and style.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions ; readings from Shakespeare and Burke. *Second Term.*—Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose ; orations, essays, and discussions.

Letters of inquiry for further information in regard to special departments of the University may be addressed to the head of the department concerning which the inquiry is made.

MEANS AND FACILITIES FOR EDUCATION.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls are devoted to lecture-rooms. The other halls contain rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING, are the offices of the President, the Treasurer, and the Registrar of the University, and the Faculty Room.

In the NORTH BUILDING is the Hall of the University Literary Societies, where the Young Men's Christian Association also hold their meetings. It contains, moreover, fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE MC GRAW BUILDING.

This building, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone, quarried on the University grounds, but with dressings and cornices of Onondaga gray limestone. In its architecture it corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter containing three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and in the galleries on the second floor are the various museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath

this are the rooms at present occupied by the Department of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University, the nine smaller bells of the McGraw chimes and the great University clock. The interior of the McGraw building is solidly finished with native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professor of Industrial Mechanics, and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE FOR WOMEN.

This is the gift of Honorable Henry W. Sage. It is not a separate department or school, but merely a home or dormitory for women students. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will

accommodate about one hundred pupils. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE SAGE CHAPEL.

This Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require. The discourses spoken of above—under the head of religious instruction, are delivered in this Chapel; and the Daily Morning Prayers of the University are also held here.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above the town. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream, and enter the University campus on the south side.

II. LABORATORIES.

1. THE ANATOMICAL LABORATORY.

The Anatomical Laboratory is in the second story of the McGraw building, adjoining the Museum and lecture-room. In the laboratory are all of the alcoholic collections. Among these are specimens and dissections of the *fishes of Cayuga Lake*; a series of *embryos*, especially of mammals; a series of *brains* of all classes of vertebrates; Brazilian fishes, reptiles and mammals. A large lot of *amphioxus* has lately been received from Italy, and each special student will be enabled to dissect one or more specimens of this, the lowest known vertebrate animal.

2. THE CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in GENERAL Chemistry, and a smaller one for the class in AGRICULTURAL Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors, and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunson filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

3. THE ENTOMOLOGICAL LABORATORY.

The Entomological Laboratory is in the McGraw Building and on the same floor as the Anatomical Laboratory. In it is the collection in Entomology, and the work in this Laboratory is under the guidance of a special instructor. Among its collections are a series illustrating the entire life-history of injurious insects, their transformation, food, parasites, etc.

4. THE GEOLOGICAL LABORATORY.

The Geological Laboratory is in the south wing of the McGraw Building, second story, adjacent to the Geological Museum. It is furnished with tables and means for laboratory work, a very complete collection of specimens and books for reference; there are also a large number of photographs, illustrating geological phenomena, from the Hayden expedition and the Pacific Coast surveys, and other sources.

5. THE MECHANICAL LABORATORY.

The Mechanical Laboratory, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, and a grinding

machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard guages in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam-engine in case of accident to the water power.

6. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but good practical provision for this work has been made: The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illustrative experiments. Several rooms in the South Building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarized light, and photometry. In the Chemical Laboratory Building, a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern-slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Dubosoq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet and a Gramme electro-magnetic machine, made at the University work-shop.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

7. THE DRAUGHTING ROOMS.

There are four Draughting Rooms, fitted up with tables, models, and whatever is needed for the work to be done in them. (1.) The Architectural Draughting Room, in the north wing of the McGraw Building, under the direction of Professor Babcock. (2.) The Engineering Draughting Room, in the north wing of the Chemical Building, under the direction of Professor Fuertes. (3.) The Mechanical Draughting Room, in the Sibley College, under the direction of Professor Morris. (4.) The Free-hand Drawing Room, occupying the third story of the Sibley College, under the direction of Assistant Professor Cleaves.

8. THE GENERAL FARM.

The University farm consists of about 100 acres, exclusive of the experimental farm, the campus, and timber land. A large proportion of this is devoted to the raising of food for the domestic animals. In addition to the animals kept for labor and the production of milk, are a few specimens of the leading breeds of cattle, sheep, and swine, the primary object of which, is class illustration. The object of the system pursued consists in raising to the highest standard the condition of the soil and its productive power. But it is evident that this can be accomplished only by a well defined system of rotation, and years of careful and judicious management.

It is further evident that the high price of labor and of fertilizers are the principal obstacles to be overcome in advanced agriculture. By the more extended use of labor-saving implements and the horse in the operations now so often performed by hand, supplemented by the liberal application of fertilizers and clover, we are sanguine that it may be conducted within the limits of economical labor. The general farm is made supplementary to the experimental, by duplicating the experiments of the latter but on a larger scale.

The statistics of the general farm as well as the experiments are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

The old barns near the University buildings have been repaired and adapted to general farm purposes. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and illustration the best tools of their kind that the market affords.

9. THE EXPERIMENTAL FARM.

Forty acres of the general farm are used in conducting experiments in the rotation of crops, the various modes of cultivation, the value and application of domestic and imported fertilizers, the hardiness, productiveness, and value of the various grains and grasses, and in originating and testing new varieties. To aid in conducting these experiments, a new and commodious barn has been erected, and adapted for that purpose; it will aid for experimentation in feeding domestic animals. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five thousand square feet, is divided into box-feeding stalls, sheep pen,

horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

III. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work and in various languages. From it have been issued the UNIVERSITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

The facilities of the printing office have been increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting, will be provided with work and the means of further instruction.

IV. THE UNIVERSITY LIBRARY.

The University Library contains about forty thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRA-

RY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelley, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible; the first one—Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

V. THE READING ROOM.

The Library is open and accessible to all registered students every week day from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:—

American.—American Journal of Science; Atlantic Monthly; Canadian Monthly; Country Gentleman; The Nation; Monthly Report of the Department of Agriculture; New York Medical Jour-

nal; North American Review; Harper's Magazine; Historical Magazine; Horticulturist; Journal of the Franklin Institute; Official Gazette of the Patent Office; Prairie Farmer; Railroad Gazette; Railway Review; Specifications of Patents; American Bibliopolist; Cornell Review; Journal of the Telegraph; Journal of Social Science; Medical Eclectic; Penn Monthly; Popular Science Monthly; Publisher's Weekly; Unitarian Review.

English.—Academy; Anthropological Review; Athenæum; Blackwood's Magazine; Bookseller; Builder; Chemical News; Edinburgh Review; Engineer; Examiner; Frazer's Magazine; Guardian; Illustrated News; Journal of the Geological Society; Journal of Microscopical Science; Journal of the Royal Agricultural Society; Mechanics' Magazine; North British Review; Notes and Queries; Pharmaceutical Journal; Philological Society's Proceedings; Popular Science Review; Quarterly Journal of Science; Quarterly Review; Saturday Review; Spectator; Veterinarian; Westminster Review.

French.—Annales de Chimie; Annales des Mines; Annales des Ponts and Chausées; Bibliographie de la France; Bulletin du Bibliophile; Bulletin de la Société chimique; Comtes Rendus; Illustration; Journal de l'Agriculture; Journal de l'Anatomie; Journal de Mathématique; Journal de Menuisérie; Nouvelles Annales de Mathématique; Recueil de Médecine Vétérinaire; Revue des deux Mondes; Revue de l'Architecture; Revue politique et littéraire; Revue scientifique; Revue de Zoölogie.

German.—Annalen der Chemie und Pharmacie; Annalen der Physik; Archäologische Zeitung; Archiv für Anatomie; Archiv für das Studium der neuren Sprachen; Chemisches Centralblatt; Fortschritt der Physik; Hermes; Historische Zeitschrift; Illustrirte Zeitung; Im neuen Reich; Archiv für mikroskopische Anatomie; Archiv für pathologische Anatomie; Bauzeitung; Beiträge für Sprachforschung; Bericht der deutschen Chemischen Gesellschaft; Literarischer Wochenbericht; Milch Zeitung; Palæontographica; Petermann's Mittheilungen; Philologus; Polytechnisches Journal; Jahrbuch für wissenschaftliche Botanik; Jahresbericht für Chemie; Journal für praktische Chemie; Journal für Mathematik; Landwirthschaftliche Versuchs-Stationen; Landwirthschaftliches Centralblatt; Literarisches Centralblatt; Repertorium der Thierheilkunde; Repertorium für Experimental Physik; Rheinisches Museum; Zeitschrift der morgenländischen Gesellschaft; Zeitschrift für analytische Chemie; Zeitschrift für bildende Kunst; Zeitschrift für Sprachforschung; Germania vierteljahrsschrift für deutsche Alterthumskunde; Jahrbuch für Romanische und Englishe Sprache und Literatur; Jahresbericht über die Fortschritte der classischen Alterthumswissenschaft; Journal für die reine und angewandte Mathematik; Mittheilungen über wichtige neue Erforchungen; Zeitschrift für Bauwesen; Zeitschrift für Volkerpsychologie.

VI. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Frères Chrétien, of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern-slides to be used in the camera as illustrating various remarkable buildings and the various styles of architecture.

The architectural department in the University Library is particularly full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modèles Clastiques* of plants, on a magnified scale, by Auzoux, of Paris, and plant models designed and executed by Brendel, of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil

by Professors Prentiss and Hartt and Mr. Derby; (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh; (5) A small collection of economic vegetable products.

4. GEOLOGY AND PALÆONTOLOGY.

This Museum comprises:—(1) The JEWETT COLLECTION, embracing a large number of species of fossils, mainly from the New York formations, many of which are illustrated by type-specimens figured and described in the reports of the New York State Geological Survey; (2) A series of rocks and fossils of the Devonian Age to illustrate the geology of Ithaca and vicinity; (3) The HARTT COLLECTION (deposited) of rocks and fossils from the British Provinces and Brazil; (4) The collections of rocks and fossils made by Professor Hartt and his parties on the two Morgan expeditions to the Amazonas in 1870 and 1871; (5) The WARD COLLECTION of casts of fossils, presented by Mr. Cornell; (6) Several miscellaneous collections of ores, rocks and fossils obtained through gift, purchase or exchange; (7) A collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard on the Amazonas in 1870 and 1871; (8) A number of skeletons from the Anglo-Saxon Cemetery at Frilford, England, with a variety of ethnological relics from the same place, the whole presented by Professor George Rolleston, of the University of Oxford; (9) A valuable collection of ancient Peruvian pottery, presented to the Museum by President White; (10) The T. B. COMSTOCK COLLECTION (deposited), of rocks, fossils and minerals, including a quantity of hot spring and geyser deposits from the Yellowstone National Park, with volcanic rocks and other material collected by Professor Comstock, while acting as the geologist of the N. W. Wyoming expedition, in 1873; (11) The SIMONDS COLLECTION (deposited), made up of fossils from the Cayuga Lake Basin, especially from the Hamilton and Chemung groups, and containing many forms as yet undescribed; (12) Several hundred lantern-slides to illustrate the lectures on geology, palæontology and archæology; (13) A number of large photographs illustrating the geology, etc., of the Rocky Mountains and the Pacific Coast, taken on the Hayden Survey and the U. S. Coast Survey; (14) The W. A. JONES COLLECTION (deposited), comprising a choice selection of fossils and minerals from N. W. Wyoming and elsewhere, collected by Captain Jones of the U. S. Engineer corps.

5. MINERALOGY.

The SILLIMAN COLLECTION of minerals, formerly the private collection of the late Benjamin Silliman, is located in the main hall of the McGraw building and contains many valuable specimens. There is also a small but constantly increasing working collection

of minerals situated in the Chemical Laboratory which is used more especially by the students in determinative mineralogy and blow-pipe analysis.

6. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art at the present time; as well as a collection of curious things pertaining to the department, is being made and will comprise arms of various patterns, shot, shell, and the various kinds of ammunition in use in the army of the United States. It is believed that the student being familiarized with the different articles and their nomenclature, will be enabled to comprehend much better the technical statements of military history; and if his services are required by the national government this information will be of advantage.

7. TECHNOLOGY.

Besides the models made at the University, the Museum of Technology and Civil Engineering comprises:—(1) A collection of working models in brass and iron, illustrative of mechanical principles applied to machinery, and an extended series of photographs for the same purpose, from the establishment of Schröder, of Darmstadt; (2) Another collection of working models in wood and iron, illustrative of intricate mechanical combinations and expedients, made under the direction of Professor Willis, of Cambridge, England, and Professor Rigg, of the College of Mechanics, at Chester; (3) Models illustrative of descriptive geometry, and bridge and roof construction, made by Schröder; (4) The diagrams and charts issued with the sanction of the English Committee of Council on Education; (5) Photographs and models from various sources; (6) A collection of engineering instruments.

8. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoology, which are available for the educational purposes of the University, are made up of the following:—(1) THE GREENE SMITH ORNITHOLOGICAL CABINET, a mounted and classified collection of 362 birds, principally American, made and presented to the University by Mr. Greene Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL COLLECTION, including about twenty-five thousand species; (3) The *Modèles Clastiques* of Dr. Auzoux, of Paris, illustrative of comparative anatomy and physiology; (4) The lithographic charts and diagrams edited by Achille Comte of Paris, and those published under the auspices of the Council of Education at London; (5) A constantly increasing collection of native animals in alcohol, and of preparations illustrating their structure; (6) A collection of insects to which additions are constantly made, specially intended

to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoological specimens deposited by Professors Wilder and Hartt.

VII. COLLECTIONS IN THE FINE ARTS.

The foundation of a Museum of the Fine Arts has been laid by depositing in the University, for the use of the Faculty and undergraduates, the following: (1) A valuable collection of photographs, especially rich in illustrations of architecture and of art applied to manufactures; (2) Paintings in oil, including full length portraits of Professor Goldwin Smith and George William Curtis, by Carpenter, presented by President White; with portraits of Humboldt, Hon. Hiram Sibley, Peter Cooper and Prudence Crandall; (3) Bronze copies of masterpieces of statuary, including three of Michael Angelo's works, two busts by Burton, one of President White, a gift of some friends of the President, and the other of Professor Wilson, a gift of the Students of the University, and an original bust of Lincoln; (4) Many portfolios of engravings illustrative of Christian art, and of the history of art in general, including the publications of the Arundel Society and the Berlin Museum series, as well as the series of heliotype reproductions of the Gray collection.

There is also quite a collection of busts of distinguished men of Classic, Gothic, Renaissance and Modern Sculpture, and architectural ornamentation, made under the direction of the South Kensington Museum, and by Brucciana of London, arranged for the use of students in Free-hand drawing, and for the departments of Architecture and Engineering.

VIII. UNDERGRADUATE SOCIETIES.

The following associations have been formed by the undergraduates:—(1) A Natural History Society; (2) A Chemical Club; (3) An Agricultural Club; (4) An Engineering Club; (5) A Society for Mechanical Engineering; (6) Four literary societies, known as the "Irving," the "Philaletheian," the "Adelphi," and the "Curtis;" and (7) a "Christian Association," meeting Thursday evenings and on Sunday afternoons.

ADMISSION AND GRADUATION.

ENTRANCE EXAMINATIONS.

1. Candidates for admission must be of good moral character and at least sixteen years of age, and if women, seventeen. They will be required to pass thoroughly satisfactory examinations in the following subjects:—(1) Geography, political and physical. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic, including the metric system. (4) Physiology (Dalton's, Huxley and Youman's, or Cutter's preferred). (5) Plane Geometry, and (6) Algebra, through Quadratic Equations.

An examination in these subjects, if satisfactorily passed, will admit the applicants to the University as *Optional* students or to the courses in Agriculture and the Mechanic Arts.

2. For admission to the courses in Architecture, Civil Engineering and Mathematics, besides what is mentioned above, an examination will be required in Solid Geometry, and Plane Trigonometry (Chauvenet's or Greenleaf's required), including the theory and use of Logarithms.

3. Of all candidates for admission to the courses in Science, Science and Letters, Literature, Philosophy, Mathematics, Natural History, and Chemistry and Physics, examinations will be required, besides those named in the first paragraph above, either (1) in the principles of French Grammar and Construction, and the first book of Voltaire's Charles XII, or its equivalent; or (2) the principles of German Grammar and Construction (Whitney's or Comfort's Grammar preferred), and seventy-five pages of Whitney's Reader, or its equivalent; or (3) Algebra entire (equivalent to Davies' Bourdon), Solid Geometry, and Trigonometry, Plane and Spherical.

In case students who are intending to enter one of the above courses are not prepared in either their French or German or the extra mathematics, they can enter as optional students and make up these deficiencies by reciting in these studies in the University.

Regents' certificates issued by the Regents of the State of New

York will be accepted instead of entrance examinations in Arithmetic, Geography and English Grammar.

Certificates issued by the Superintendent of Public Instruction of the State of New York, and certificates of having passed satisfactory examinations at any of the normal schools, academies or high schools of the State of New York, whose requirements for graduation meet the approval of the Faculty, in Arithmetic, Grammar, Geography, Physiolgy and Plane Geometry, will be accepted in the case of students who have graduated in such schools, instead of an entrance examination in the studies above named.

For the Course in NATURAL HISTORY, candidates will be examined also in Plane Trigonometry; Allen's Latin Reader, or some equivalent for it, with an adequate amount of grammatical knowledge; and in Greek, the alphabet and enough of the language to enable the student to recognize, analyze and form scientific technical terms.

For the Course in LITERATURE and that in PHILOSOPHY, besides the general entrance examinations and the French or German, they will be examined in Latin Grammar, including prosody: Composition (Arnold's first twelve chapters); Allen's Reader, or four books of Cæsar's Gallic War; Virgil's Eclogues, Georgics, and six books of the Æneid; six Orations of Cicero.

For the Course in ARTS, or the Classical Course, the examinations will be the same as for the Course in Literature, (including the general entrance examinations), with the addition of an examination in Greek; Greek Grammar (Goodwin's); writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; and the History of Greece.

NATURE OF THE EXAMINATIONS.

Some idea of the character of the Entrance Examinations may be derived from the specimens of examination papers given below. They are in all cases papers that have actually been given to classes when examined for admission, and are but fair samples of what will be given hereafter. And although perfect answers to all the questions are not indispensable, yet a near approach to perfection is required in all cases.

Deficiencies are common in all branches; but perhaps the greatest are in the elementary branches, as in English Grammar and Algebra, especially in fractions, exponents and radicals. In the Låtin and Greek also they are very great.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities, must present certificates of honorable dismission, after hav-

ing passed at least one term's examinations. They will, on such a testimonial, be admitted to the University without further examinations. The testimonial must certify to both good character and good scholarship. Such a testimonial will merely admit the bearer to the University; it will not admit him to any particular advanced standing. On this admission he will be allowed to join any class in any study that requires no previous preparation except the general preparation for admission to the University, as for example, French with the Freshman class, German with the Sophomore.

But if the student desires to join any class in Latin, Greek, advanced French or German, or Mathematics, he must apply to the professor in charge of the department, and undergo such examination as he may require in order to satisfy himself of the student's ability to go on with the class.

Students coming from other colleges or universities, are *in no case* admitted at *once* to any advanced standing as Sophomore, Junior or Senior. The class distinctions indicated by those names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of this University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need to prepare themselves for graduation here, without regard to the class distinctions above alluded to.

After having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, such students may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to,—the Faculty by this act accepting their studies elsewhere as equivalent to what they would have done here if they had entered the University at the beginning of their collegiate course.

DIRECTIONS FOR ADMISSION.

The candidate will first apply to the Registrar, at South University Building.

1. In case he comes from another college or university, with the "Dismissal" above described, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

2. But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations.

The Entrance Examinations will be held on the days indicated in the calendar on the 7th page of the Register.

For all examinations, except that in June, beginning the Monday before Commencement, the appointments are as follows:

On Tuesday, beginning at 10 o'clock, a. m., arithemetic, algebra and plane geometry, with a recess from 1 to 2.30 p. m.

On Wednesday, physiology 8 a. m., geography 10 a. m., English grammar and orthography 2.30 p. m.

On Thursday, 9 a. m., French, German, Greek and solid geometry; at 2.30 p. m., Latin and plane trigonometry.

The entrance examinations held in Commencement week will be at the same hours and will be held one day earlier in the week, beginning on Monday instead of Tuesday.

Candidates for admission should be here on the day set and at the hour named for the beginning of the examinations, as each examination is complete by itself, and will not be repeated until the beginning of the next term, except in cases where very urgent reasons have prevented the student's being present at the regular entrance examinations.

After his examinations he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing all the examinations required, and showing to the professor his registration ticket.

In case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examinations, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *No optional or other course will be possible* without some advance beyond the mere entrance examination.

ADMISSION TO AN ADVANCED STANDING.

Students who have prepared themselves for an advanced standing in the University, at academies or public schools, not having entered any other college or university, will be required to pass the entrance examinations. After that they will be in the same relation to their classes as those that have come from other colleges. They will be admitted at first as optional students, and will afterwards pass the examinations for the standing they seek, at the times appointed by the several professors whose classes they propose to enter.

These examinations are required for two classes of cases:—

(1.) Students, who desire to join an advanced class in any Department, as Mathematics, French, German, without intending to graduate, are required, before joining such class, to pass an examination in the studies that have been pursued by that class, in order to test their ability to go on with it.

(2) Students *intending to graduate* in any course will be required to pass an examination, with the classes in the University, in those studies of the course which they may have pursued elsewhere.

Students who fail at any examination must take the study over again; those who are conditioned must make up their condition at the first ensuing examination on the same subject, and any professor may exclude from his class any student who, after having had one opportunity to do so, shall have failed to remove his condition.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate degree in this University, or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular professor or special faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

A schedule of the lectures and exercises for each term is issued at the beginning of the term.

The day next preceding that on which instruction begins is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

The beginning and end of all lectures and recitations are determined by the ringing of the great bell in the McGraw tower. Lectures and class exercises commence at 8 A. M. and continue until 1 P. M. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term. To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

Reports of all examinations are made and a record of them is kept by the Registrar. Notice is sent to each student or his parents, of any condition or failure at an examination as soon as may be after the end of the term at which it occurred. A Course Book also has been provided which the students may procure and in which they may have an entry made, term by term, indicating the grade at which they passed their examinations.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is required for continuance in the University, or a marked proficiency in some one of the more general departments of study. And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one or more terms in the University, as a registered student taking such studies as the Faculty may require. And all Diplomas will be dated from the time when they are granted.

COMMENCEMENT THESES.

Each student is required. before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere boys, assuming no farther control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory

practice, each week, and for the term in which Drill is required, either the Drill or two hours of extra study, and that no student is allowed to take an optional course that is not approved by the Faculty as worthy of his time and efforts.

Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without leave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty.

Any student found guilty of intoxication or other gross immorality will be at once dismissed.

And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to re-enter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred on all those students who satisfactorily complete any one of the five courses: Science, Science and Letters, Chemistry and Physics, Mathematics, or Natural History. And the particular course pursued by the student is specified in the Diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are given to the students who satisfactorily complete the courses corresponding to the degree named. The degree of Bachelor of Veternary Science is also given to students who complete a full course of four years in that department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the course leading to it in precisely the same order as it is laid down in the statement of courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register. But very few of those who attempt an optional course succeed in graduating in any course.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are offered.

A fee of five dollars is charged in all cases for Baccalaureate degrees, which must be paid before the diploma will be given.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out in the following General Departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any student intending to take a second or advanced degree should apply to the Faculty to be admitted a candidate for the degree he wishes to take, and signify the department in which he wishes to prepare himself for the degree.

MASTER'S Degrees in Arts, Literature and Science, will be conferred on those who have taken the Bachelor's degree in this University or elsewhere, where the requirements for those degrees respectively are equal to our own, on the following conditions:

1. After having spent at least one year in this University in a course of post-graduate study marked out by the Faculty in each case, presented a satisfactory thesis and passed a satisfactory examination at the University in the course of study pursued.

2. The same degrees will be conferred without residence on graduates of this University only, on conditions the same in all respects as above, except that the degree will not be given until three years after the Baccalaureate Degree has been taken.

The degree of MASTER OF SCIENCE will be conferred on those who have graduated in the Course in Philosophy on the same conditions as upon those who have graduated in the Course in Science.

The degree of CIVIL ENGINEERING is conferred upon such Bachelors of Civil Engineering as, after six terms or two years of additional study and practice, shall have passed the requisite examinations in the School of Engineering.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of Bachelor of Veterinary Science and who shall have passed satisfactory examinations therefor.

The degree of DOCTOR OF PHILOSOPHY will be conferred on graduates of this University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to our own on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required here for graduation in the Course in Philosophy, a knowledge of Greek equal to that required here for admission to the Course in Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

3. He must pass an examination upon the course marked out and present a meritorious thesis upon some subject included in the course of study.

The degree of DOCTOR OF SCIENCE will be conferred on graduates of this University, and other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have

(*a*) A knowledge of Latin and Greek at least equal to that now required for admission here to the Course in Natural History.

(*b*) A knowledge of French and German equal to that required here for graduation in the Course in Science.

(*c*) A knowledge of science, of literature and of philosophy equal to that required here for graduation in the Course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Every successful candidate for any advanced degree will be required to pay to the Treasurer ten dollars before receiving his diploma.

They will also be required, in the case of the Doctor's degrees, to print their theses and deposit fifty copies in the Library of the University before receiving their diplomas.

In all other cases of second degrees the successful candidate will be required to deposit a copy of his thesis in the University Library.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Candidates for any second degree are required to make their applications for examination and present their theses at least twenty days before the annual Commencement at which they propose to take their degree.

A committee consisting of four members of the Faculty will superintend the examinations, which will take place during the second week previous to Commencement week.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates or certificates of proficiency, are conferred upon students who have pursued a special course in any branch of knowledge. They are given upon the recommendation of the respective Faculties.

CERTIFICATE OF JOURNALISM.

Although no special course has been arranged in journalism, arrangements have been made for giving special instructions to those who intend to make journalism their profession. These arrangements consist, so far as the University is concerned, in

The art of printing. Students will be required to do work at type-setting in its various branches, the reading and correction of proofs, the making up and working off of forms, in the University printing-office, under the direction of the Director of the University Press, to such an extent that they will be able to take charge of an office and do book and job work by themselves.

Besides this, students will be required to study phonography, under an approved teacher, and to acquire some knowledge of telegraphy; and as neither of those subjects is taught in the University they must be acquired by the students outside of the University, and at their own expense.

To all students in either of the General Courses who shall have complied with the foregoing conditions there will be given, in addition to the Diploma appropriate to their course, a *Certificate of Journalism*, signed by the University authorities and the University seal affixed, as follows:

1. To all students in the Course in Literature, or in that in Philosophy, who shall have satisfactorily completed the course.

2. Of students in the Course in Arts it will be further required that they shall have taken at least one term in French and two in German in their course.

3. Of students who have completed the Course in Science it will be required that they shall have taken all the studies that are in that course in the departments of History, of Languages and of Philosophy and Letters, and shall have prepared themselves, *outside of the University course*, to pass, before the beginning of their fourth or Senior year, a satisfactory examination in Latin Grammar and some Latin Reader, sufficient to enable them to read and translate ordinary Latin Sentences.

PAYMENTS TO THE UNIVERSITY.

Free tuition is given:

1. To all State students appointed as described on p. 35.

2. To all resident graduates of this University and graduates of other colleges and universities whose requirements for graduation are equal to our own.

3. To agricultural students who are (1) pursuing either the three or the four years course and *intending to complete* the course; or, (2) to other students, *for two years only*, who take not less than ten hours of recitations per week in two or more of the following departments: (*a*) Agricultural Chemistry; (*b*) Veterinary Science; (*c*) Practical Agriculture and Farm Work; (*d*) Botany, Horticulture, and Entomology as applied to Agriculture,

For all others the tuition fee is twenty-five dollars a term.

No matriculation or entrance fees are required ; nor is any discrimination made between students coming from other States.

The fees for instruction must be paid in advance, at the beginning of each term.

All students are, moreover, held responsible for any injury done by them to the property of the Institution.

Each student intending to take laboratory practice in Chemistry must deposit with the Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

The following is an approximate estimate of the yearly expenses:—

Fees for instruction, $25 a term, - - - - - -	$ 75.00
Room, board, lights and fuel, about - - - -	240.00
Total, - - - - - - -	$315.00

Cascadilla Place, formerly kept by the University as a boarding-house for professors and students, is now rented to be kept for the same purpose. It is convenient to the University, and board with rooms, fuel, etc., can be had in it at an expense of from five five to seven dollars per week.

The Sage College is open as a dormitory and boarding-house for women students only. The cost for board, room rent, fuel and lights will be about $7.00 per week, to be paid in advance. Washing will be done in the building at the usual rates of charge for such work.

Other items will vary with the student's disposition and habits. Text-books and stationery cost from $20 to $30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

COURSES OF STUDY.

The Courses of Study, both General and Technical, are made up of the instruction already described under the title of "Scope of the Instruction" as given in the various departments and schools of the University, combined in different proportions and groupings, as will be seen below.

In the following statement of the several courses the figures in parentheses denote the number of exercises per week. The word "or" in italics between two or more studies denotes that they are equivalent for each other and that either of them may be taken at the option of the student.

In computing Laboratory Practice two hours and a half of actual work is regarded as equal to one recitation. And no student is received in any Laboratory for less than seven and a half hours of actual or the equivalent of three recitations per week, except in regular courses where a shorter time is specified.

In Drafting and Shop Work three hours of actual work are required as the equivalent of one recitation.

I. THE COURSE IN ARTS.

Leading to the degree of Bachelor of Arts.

[*Italics denote elective studies.*]

FIRST OR FRESHMAN YEAR.

First Term.—Greek (4); Latin (4); algebra (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Greek (4); Latin (4); solid geometry (5); rhetoric and composition (2).

Third Term.—Greek (4); Latin (4); trigonometry and mensuration (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Greek (4); Latin (4); exercises in rhetoric (1), *physiology, French, German, mathematics, experimental mechanics* (6).

Second Term.—Greek (4); Latin (4); exercises in rhetoric (1); *zoology, French, German, mathematics, chemistry, electricity and magnetism* (6).

Third Term.—Greek (4); Latin (4); exercises in rhetoric (1); *botany, modern languages, mathematics, electricity and magnetism* (6).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (3); essays (1); *Greek, Latin, modern languages, English literature, Roman history, mathematics, heat, geology* (11).

Second Term.—Political economy (2); essays (1); *Greek, Latin, modern languages, English literature, mathematics, astronomy, acoustics and optics, history of Roman empire* (12).

Third Term—Logic (3); essays and criticism (1): *Greek, Latin, modern languages, English literature, Mediæval history, mathematics, acoustics and optics* (11).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); general literature (3); *Greek, Latin, modern languages, pure mathematics, applied mathematics* (10).

Second Term.—Moral philosophy (2); general literature and modern oratory (3); *Greek, Latin, modern languages, special literature, history, pure mathematics, applied mathematics* (10).

Third Term.—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors: *Greek, Latin, history, modern languages, pure mathematics, applied mathematics* (10).

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

II. THE COURSE IN LITERATURE.

Leading to the degree of Bachelor of Literature.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); physiology (3); rhetoric

and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Geometry (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4); botany (3); Anglo-Saxon (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5) and French (3), *or* French (5) and German (3); Anglo-Saxon (3); Latin (4); exercises in rhetoric and composition (1).

Second Term.—German (5) and French (3), *or* French (5) and German (3); early English (3); Latin (4); exercises in rhetoric and composition (1).

Third Term.—German (5) and French (3), *or* French (5) and German (3); Latin (4); early English (2); rhetorical exercises and composition (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (4); Latin, modern languages, *or* science (6); special literature (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2): history of the Roman Empire (4); Latin, modern languages *or* science (6); special literature (2); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history(4); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Second Term.—American history (2); philosophy of history (3); political economy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Third Term.—American law (5); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4); attendance on lectures of non-resident professors and preparation for Commencement.

Students who enter this course with an entrance examination in German will take elementary French and advanced German in the second year. And those who have French for their entrance examination will take elementary German and advanced French during that year.

III. COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); French *or* German (5); rhetoric and composition (2); six lectures on hygiene, to begin on the first Tuesday in October.

Second Term.—Geometry (5); Latin (4); French *or* German (5); rhetoric and composition (2).

Third Term.—Trigonometry (5); Latin (4); French *or* German (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—German *or* French (3); physiology (3); analytical geometry (5); experimental mechanics (3); exercises in rhetoric (1).

Second Term.—German *or* French (3); zoology (3); calculus *or* astronomy (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—German *or* French (3); botany (3); electricity and magnetism (2); chemical lectures (3); laboratory practice (3); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history, science *or* languages (4); chemistry (2); geology (3); heat (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman Empire, science *or* languages (6); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history, science *or* languages (6); acoustics and optics (3); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law (5); general literature and oratory (3); *optional* (5); attendance on lectures of non-resident professors and preparation for Commencement.

Students who enter this course will, after passing an entrance examination in French, take elementary German the first year and advanced French the second, and those who enter with a preparation in German will take elementary French the first year and advanced German the second.

IV. COURSES LEADING TO THE DEGREE OF BACHELOR OF SCIENCE.

1. THE COURSE IN SCIENCE.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Solid geometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); analytical geometry (5); experimental mechanics (3); rhetorical exercises (1).

Second Term.—French *or* German (3); zoology (3); calculus *or* astronomy (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—French *or* German (3); botany (3); electricity and magnetism (2); chemical lectures (3); laboratory practice (3); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Heat (2); chemistry (2); geology (3); English literature (1); essays (1); *optional*, six hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* or *zoology*.

Second Term.—Acoustics and optics (3); geology (3); English literature (1); essays (1); *optional*, seven hours, of which at least four must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*) or *zoology*.

Third Term.—Acoustics and optics (3); descriptive geometry (4); English literature (1); essays (1); *optional*, seven hours, of which at least four must be given to one of the following sciences: *botany*, *chemistry*, *geology* or *zoology*.

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); *optional,* eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany, chemistry, geology, mathematics, physics* or *zoology.*

Second Term.—American history (2); political economy (2); *optional,* eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

Third Term.—Constitution of the United States, twelve lectures. *Optional,* eleven hours, subject to the same conditions as in the first term of this year.

The names of the sciences in the above lists of optional studies are used in the widest sense, and as including several quite distinct courses of lectures and laboratory practice, any of which may be taken either alone or in combination with others.

The optional hours not required for science in the junior and senior years may be given to either scientific, literary, historical or philosophical subjects. In electing their particular lines of study in the sciences of the junior or senior year, students will be required to take at least the minimum amount of each science elected that is given throughout the whole year.

Students intending to take the physics of the senior year must take the calculus of the sophomore year; those intending to take geology of the senior year must take blow-pipe determination of minerals previous to that year.

Students who have had an entrance examination in German will take elementary French five times a week and advanced German three times a week during the first year and advanced French three times a week during the second year, both in this course and in the course in science and letters; and those who have their entrance examination in French will take elementary German and advanced French the first year and advanced German the second year.

Students who enter with algebra, geometry and trigonometry will take elementary French and German with physiology, zoology and botany the first year, and advanced French and German the second year.

2. COURSE IN SCIENCE AND LETTERS

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Geometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); physics 3); ancient history (1); rhetoric (1); modern languages, (2); *optional* (2).

Second Term.—French *or* German (3); zoology (3); physics (3); chemistry (3); ancient history (1); rhetoric (1); modern languages (2).

Third Term.—French *or* German (3); botany (3); physics (3); chemistry (3); ancient history (1); rhetoric (1); modern languages (2).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (4); geology (3); essays (1); English literature (1); *optional* (4).

Second Term.—Moral philosophy (2); history Roman Empire (4); essays (1); English literature (1); *optional* (7).

Third Term.—Logic (3); mediæval history (4); essays (1); English literature (1); *optional* (6).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law and polity (5); general literature and oratory (3); *optional* (5).

The hours marked optional may be filled with any science, mathematics, modern languages or literature, for which the student is prepared by previous study.

3. COURSE IN CHEMISTRY AND PHYSICS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Solid geometry (5); French and German (8), rhetoric and composition (2).

Third Term.—Trigonometry (5); French and German (8); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); French *or* German (3); experimental mechanics (3); physiology (3); chemical practice (2).

Second Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); zoology (3); chemical practice (6).

Third Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); botany (3); chemical practice (4).

THIRD OR JUNIOR YEAR.

First Term.—Chemical philosophy (3); heat (2); geology (3), chemical practice (7).

Second Term.—Chemical philosophy (3); mineralogy *or* metallurgy (2); organic chemistry (1); acoustics and optics (3); geology (3); chemical practice (5).

Third Term.—Chemical philosophy (3); chemical technology (2); acoustics and optics (3); chemical practice (7).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); physical practice (4); chemical practice (11).

Second Term.—Metallurgy *or* mineralogy (2); organic chemistry (1); chemical practice (8); physical practice (4).

Third Term.—Chemical technology (2); chemical processes (2); chemical practice (5).

4. COURSE IN MATHEMATICS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Algebra (2); spherical trigonometry (3); French and German (8); rhetoric and composition (2); linear drafting (2).

Third Term.—Harmonoid geometry (3); French and German (8); botany (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); experimental mechanics (3); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Second Term.—Analytic geometry of three dimensions (2); modern methods in analytic geometry (3); calculus (3); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Third Term.—Calculus continued (5); descriptive geometry (4); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); descriptive geometry continued (4); heat (2); physiology (3); essays (1).

Second Term.—Differential equations (3); quaternions (2); acoustics and optics (3); chemistry (3); zoology (3); essays (1).

Third Term.—Differential equations continued and theory of functions (5); acoustics and optics (3); chemistry (3); logic (3); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Analytic and celestial mechanics (3); mathematical essays (1); shades, shadows and perspective (3); history (3); geology (3); history of philosophy (2); English literature (1).

Second Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); astronomy (5); history (4); English literature (1).

Third Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); twelve lectures on the Constitution of the United States; English literature (1); *optional* (6).

For most of those studies in this course which are not closely connected with mathematics, substitutes will be allowed.

5. COURSE IN NATURAL HISTORY.

FIRST OR FRESHMAN YEAR.

First Term.—Modern languages (8); rhetoric (2); free-hand drawing (3); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

Third Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Modern languages (3); rhetoric (1); lectures on human physiology (3); physiological laboratory work (5); experimental mechanics (3).

Second Term.—Modern languages (3); rhetoric (1); lectures on general zoology (3); laboratory work in zoology (6); electricity and magnetism (2).

Third Term.—Modern languages (3); rhetoric (1); general lectures on botany (3); field work in botany (2); lectures on special zoology (2); laboratory work in embryology (2); electricity and magnetism (2).

THIRD OR JUNIOR YEAR.

First Term.—Lectures and laboratory work on vascular cryptogams (3); laboratory and field work on compositæ or special groups (2); lectures on geology (3); blow-pipe determination of minerals (3); heat (2); essays (1); English literature (1).

Second Term.—Lectures on vegetable physiology (3); lectures on advanced and economic geology (3); laboratory work in geognosy (3); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Lectures and laboratory work on algæ and musci (2); special field and laboratory work in botany (3); lectures on palæontology (3); laboratory work in palæontology (3); laboratory and field work in entomology (2); acoustics and optics (3).

FOURTH OR SENIOR YEAR.

First Term.—Lectures and laboratory work on fungi (3); lectures on principles of horticulture (2); lectures on anatomy and physiology of domestic animals (5); laboratary and field work in geology (5); history of philosophy (2).

Second Term.—Lectures on systematic and applied botany (3): laboratory work on graminæ or special groups (2); (the course in botany for this term alternates with that of the winter term of the junior year); laboratory work in geology or palæontology (3); advanced work in either botany, geology or zoology (8).

Third Term.—Advanced work in botany, geology or zoology (13).

Students intending to enter medical schools will be allowed to devote to human anatomy and physiology some of the time otherwise given to general zoology. In case they take a partial course of less than four years, these students are advised to arrange their studies in consultation with the several professors of Natural History.

ADDITIONAL REQUIREMENTS.

In addition to the studies named in the foregoing courses students are required, in order to take the degree to which it leads, to attend lectures on general agriculture, and the lectures on modern history by President White.

V. THE COURSES IN AGRICULTURE

THE FULL COURSE OF FOUR YEARS.

Leading to the degree of Bachelor of Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); drawing, free-hand (3); German (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.
Second Term.—Chemistry, general (3); geometry (5); German (5); rhetoric and composition (2).
Third Term.—Chemistry, general (3); German (5); rhetoric and composition (2); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); German (3); experimental mechanics (3).
Second Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); drawing, free-hand (3); German (3); electricity and magnetism (2).
Third Term.—Botany (lectures (3), field work (2) (5)); entomology (5); German (3); land surveying (3).

THIRD OR JUNIOR YEAR.

First Term.—Botany (vascular cryptogams (3), compositæ and field work (2) (5)); geology (3); heat (2); veterinary anatomy and physiology (5).
Second Term.—Acoustics and optics (3); botany (vegetable physiology, lectures (3), vegetable histology and laboratory work (2) (5); chemical practice, quantitative analysis (4); veterinary medicine and surgery (5).
Third Term.—Acoustics and optics (3); botany, special field or laboratory work (3); chemical practice, quantitative analysis (5); veterinary medicine and surgery (5).

FOURTH OR SENIOR YEAR.

First Term.—Agriculture, lectures (5); practice (3, Tuesday

and Thursday afternoons); botany (fungi (3) principles of horticulture (2) (5)); geology, practice (3).

Second Term.—Agriculture, lectures (5); practice (2, Tuesday and Thursday afternoons); botany (systematic and applied, lectures (3), laboratory work on gramineæ or special groups (2) (5)); horticulture (2).

Third Term.—Agriculture, lectures (4); practice (3, Tuesday and Thursday afternoons); building materials and construction (2); constitutional law (1).

A COURSE OF THREE YEARS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); chemistry, agricultural (5); chemical practice (3); drawing, free-hand (3).

Second Term.—Chemistry, agricultural (5); chemical practice (5); geometry (5).

Third Term.—Botany (5); entomology (5); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany (5); geology (3); mechanics (3); veterinary anatomy and physiology (5).

Second Term.—Botany (5); chemical practice (5); veterinary medicine and surgery (5).

Third Term.—Botany (3); chemical practice (4); land surveying (3); veterinary medicine and surgery (5).

THIRD OR JUNIOR YEAR.

Same as the fourth year of the four years course.

VI. COURSE IN ARCHITECTURE.

Leading to the degree of Bachelor of Architecture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric (2); free-hand drawing; linear drawing; six lectures on hygiene, begining on the first Tuesday in October.

Second Term.—Algebra (2); trigonometry (3); French *or* German (5); rhetoric (2); free-hand drawing; projection and tinting.

Third Term.—Descriptive geometry (4); draughting (2); French *or* German (5); rhetoric (2); shading.

SECOND OR SOPHOMORE YEAR.

First Term.—Descriptive geometry (4); French (3) *or* German (5); experimental mechanics (3); analytical geometry (5).
Second Term.—Calculus (5); French (3) *or* German (5); chemistry (2); electricity and magnetism (2); draughting.
Third Term.—Building materials and construction (3); French (3) *or* German (5); botany (3); electricity and magnetism (2); draughting (2); free-hand drawing (3).

THIRD OR JUNIOR YEAR.

First Term.—Shades, shadows and perspective (3); mechanics (3); heat (2); geology (3); lectures on Egyptian, Greek, and Roman architecture (3); designing.
Second Term.—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (5); optics and acoustics (3); mechanics (2); designing.
Third Term.—Optics and acoustics (3); lectures on Gothic architecture (5); free-hand drawing (3); designing (5).

FOURTH OR SENIOR YEAR.

First Term.—Lectures on renaissance architecture (3); lectures on composition and the art of designing (2); designing (10).
Second Term.—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (3); designing (4).
Third Term.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., (3); designing (9); preparation of thesis.

VII. THE COURSE IN CIVIL ENGINEERING.

Leading to the Degree of Bachelor of Civil Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric and composition (2); free-hand drawing (3); six lectures on hygiene, commencing on the first Tuesday in October.
Second Term.—Algebra (2); spherical trigonometry (3); French *or* German (5); rhetoric and composition (2); right line drawing (2); free-hand drawing (3).
Third Term.—Descriptive geometry (3); draughting (2); French *or* German (5); rhetoric and composition (2); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); descriptive geometry (4);

French *or* German (3); tinting and shading (3); draughting of original problems (2).

Second Term.—Analytic geometry of three dimensions (2); calculus (3); French *or* German (3); electricity and magnetism (2); chemistry (3); pen topography (2).

Third Term.—Calculus (5); land surveying (4); electricity and magnetism (2); chemistry (3); lettering and sketching (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); chemistry (2); architecture (3); shades, shadows and perspective (3); heat (2); topographical mapping and sketching (2).

Second Term.—Higher geodesy (5); analytic mechanics (5); mineralogy (2); acoustics and optics (3); graining and draughting details of structures (2).

Third Term.—Analytic mechanics (5); railroad surveying (5); acoustics and optics (3); colored topography (3).

FOURTH OR SENIOR YEAR.

First Term.—Spherical astronomy (5); analytic mechanics (5); geology (3); stereotomy (3); draughting of original problems; technical essay.

Second Term.—Analytic mechanics (5); metallurgy (2); advanced structural geology (3); stone cutting, original problems and draughting (5); plane table (1).

Third Term.—Civil engineering (3); engineering economy (2); bridge construction (5); water wheels (2); hydrographic surveying, chart making and geodetic practice (3); preparation of thesis.

Students in this course will be required to present, at the beginning of the first term of their second, third and fourth years, a memoir upon subjects assigned to them before the close of the spring term. The memoirs of the first two years will refer to descriptions and drawings of some important engineering work, manufacturing process or other suitable subject; but during the remainder of the course the students are required to embody in their memoirs or reports original investigations.

VIII. THE COURSE IN MECHANIC ARTS.

Leading to the degree of Bachelor of Mechanical Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); free-hand drawing and shop practice (5).

Second Term.—Solid geometry (5); French *or* German (5); free-hand drawing and shop practice (7).

Third Term.—Trigonometry (5); French *or* German (5); descriptive geometry (3); shop practice (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); German *or* French (3); machine construction (3); descriptive geometry (4); shop practice (2).

Second Term.—Analytical geometry of three dimensions (2); calculus (3); German *or* French (3); chemistry (3); electricity and magnetism (2); shop practice (3).

Third Term.—Calculus (5); German *or* French (3); electricity and magnetism (2); chemistry (3); shop practice (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5): shades, shadows and perspective (3); heat (2); chemistry (2); rhetoric and composition (2); shop practice (3).

Second Term.—Acoustics and optics (3); machine construction and drawing (4); mechanics (5); rhetoric and composition (2); shop practice (3).

Third Term.—Machine construction and drawing (4); mechanics (5); mill work (4); shop practice (2).

FOURTH OR SENIOR YEAR.

First Term.—Mechanism (5); machine drawing (4); mechanics (5); shop practice (3).

Second Term.—Designing machinery (4); physical laboratory practice (4); steam-engine (5); shop practice (3).

Third Term.—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (5).

OPTIONAL COURSES.

Optional Courses are those which the student may select for himself; and in no course is it necessary, for the attainment of a degree, that the studies should be followed exactly in the prescribed order: and in the General Courses equivalents will be accepted, in some cases, for the studies indicated, provided they are of the same general character.

Any student, however, who intends to graduate at all should by all means select the course that leads to the degree he expects to take, and follow it in the order above laid down; the disadvantages of doing otherwise are so great as to render success almost impossible.

Undergraduates are also permitted, upon proper application to

the Faculty, at the beginning of any term, to transfer themselves from one of the General Courses to an Optional Course, or, with the consent of the Faculty concerned, to any Special Course. All the courses have been arranged upon a basis of three lectures or class exercises a day, thus occupying fifteen hours a week; but students who find themselves able to accomplish more than this are allowed to take additional studies. And so, too, students who are obliged to labor as a means of self-support are sometimes, upon sufficient reasons shown to the Faculty, excused from attendance upon the full standard number of University exercises. This, however, does not obviate the necessity of completing the entire course before graduating.

POST-GRADUATE COURSES.

No regular post-graduate courses have been marked out by the various Departments of the University. It is found that in most cases, students who desire to spend a portion of time at the University after taking their Baccalaureate Degree, have each of them some one special study to pursue, or object to accomplish, which differs in so many respects from those of any other student, that it is hardly possible to classify them or to arrange beforehand, in any general way, a course that will meet their wants. Accordingly, the practice thus far has been for the student himself to indicate, on his entering the University, his wishes; and in case the studies he wishes to pursue are not already provided for in the schedule for the term, his application is referred to the appropriate Faculty or to some one professor who is in charge of the department in which his studies are chiefly comprehended, when a course is arranged for him and provision made for his prosecuting it.

JOURNALISM.

Although no special course in Journalism has been marked out students wishing to prepare themselves for Journalism or the profession of Law, who nevertheless cannot take a full course of four years, may, with the same qualifications for admission as are now required for the Course in Science, and some elementary knowledge of Latin, arrange for themselves an optional course, that can be completed in two years, which will include (1) one year of French, (2) one year of German, or two years of either or both the above languages, (3) all the studies and exercises in rhetoric, composition, oratory and general literature, (4) most of the studies in moral and intellectual philosophy, including psychology, logic, moral philosophy and the history of philosophy, (5) all the studies in the departments of history and political science.

EXAMINATION PAPERS.

I. ENTRANCE EXAMINATIONS.

[*The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek, and in Latin an oral examination was added to the written one.*]

ARITHMETIC.

1. Add together 24.6, 35.7 and 80.9; also, add together 1yd. 2ft. 8in. and 2ft. 7in.; and in each example, EXPLAIN THE REASON FOR "CARRYING."

2. The number 123.456 can be read in 33 different ways, of which the following are specimens: "123, and 456 thousandths;" "1 hundred, 2 tens, 3 units, 4 tenths, 5 hundredths, and 6 thousandths;" "123,456 thousandths;" "12 tens, 34 tenths, and 56 thousandths." Give three more of these ways.

3. Explain in full the REASON why $\frac{2}{3}$ of $\frac{4}{5} = \frac{8}{15}$.

4. Find the greatest common divisor of 238 and 553, and GIVE THE REASONING.

5. $\dfrac{2\frac{1}{3}}{3\frac{1}{8}} + \dfrac{5}{6} + \dfrac{0.001 \times 2200}{0.66 \div 0.2} = ?$

6. What sum, put at simple interest at $7\frac{1}{2}$ per cent. per annum, will amount in 3y. 4m. to $2,500?

7. At what price must 5 per cent. bonds be bought, to realize $6\frac{1}{2}$ per cent interest on the investment?

8. Explain and DEMONSTRATE the rule for cube root; and illustrate by the work for $\sqrt[3]{12{,}812{,}904}$.

[*One of the following questions may be substituted for either of the above at the option of the student.*]

9. How many grammes of distilled water, in a rectangular box 0.2 metres long, 5 centimetres wide, and 50 millimetres deep? How many kilogrammes? How many litres?

10. The locomotive of a passenger train has driving-wheels 20 feet in circumference, but in 121 revolutions, they slip back a dis-

tance equal to one circumference. A freight locomotive has drivers $16\frac{1}{2}$ feet in circumference, making 100 revolutions while the drivers of the passenger engine make 121; but in every 33 revolutions they lose one circumference by slipping. When traveling in the same direction, the passenger train gains on the other 10 miles an hour. By how many miles an hour do the trains approach each other, when moving in opposite directions?

ALGEBRA.

1. Multiply $(a-b)$ into $(x-y)$, and EXPLAIN THE REASONS for the signs in your result.

2. What is meant by the third power of a? By the fourth root of a? By $a^{\frac{3}{4}}$? By a^0? By a^{-1}? By $a^{-\frac{3}{4}}$?

3. Why is the square root of a^5 equal to the fifth power of $\sqrt{a}$?

4. Find the Least Common Multiple, and the Highest or Greatest Common Divisor, of $8a^5b^4c^3d^2$, $12b^2c^6d^0$, $30b^3c^5d$, $10ab^7c^4d^0$. Also of a^3+b^3 and $a^2x+2abx+b^2x-a^2+b^2$. EXPLAIN THE REASONS for the rules you have used.

5. Simplify and solve the equations

$$2ax = 2c - (1 - (-c+1)) + ax - by.$$
$$mx + ny = -(p \div (-1)).$$

6. Simplify each term of the following equation, and then find the value of x:

$$\frac{3(2x)^{\frac{1}{3}}(3bx)^0}{(ax)^{-\frac{1}{3}}\sqrt{6a}} + (-2^{ab})^2 = (4^b)^a + \frac{2}{1+\sqrt{3}} + x.$$

7. Solve the equation $x^2 + 6ax = b$. What conditions must a and b satisfy, in order that the two roots may both be real and positive? Both real and negative? One of each sign? Both imaginary? Equal to each other?

8. State what you can concerning the nature of imaginaries; multiply together $(1+\sqrt{-1})$ and $(1-\frac{1}{2}\sqrt{-4})$; and explain.

GEOMETRY.

1. Prove that the angles at the base of an isosceles triangle are equal: and the converse theorem.

2. Prove that if there are two sets of proportional quantities, the products of the corresponding terms are proportional: and the converse.

3. Given two irregular pentagons, construct a pentagon similar to the first and equivalent to the second.

4. Prove that in the same circle, or in equal circles, two angles at the centre have the same ratio as their intercepted arcs. [There are two cases.]

5. Prove that the angle formed by two secants that intersect without the circumference, is measured by half the difference of

the intercepted arcs; and demonstrate two of the chief theorems that are used in the proof of this. What analogous propositions are obtained when one or both of the secants are replaced by tangents, or chords, or both? Which of these can you demonstrate as corollaries of the above?

GEOGRAPHY.

1. Name the rivers of Spain, of France, of Germany, of Italy, of Russia in Europe.
2. How could one go by water from Archangel to Constantinople? From Lyons to Paris?
3. Bound Germany, Italy, Turkey in Europe.
4. Name the rivers of India, of China, of Siberia.
5. How could one go by water from Cairo in Egypt to Canton? From Malta to Glasgow?
6. Bound Persia, Arabia, Afghanistan.
7. Over what countries would one pass in going in a straight line from Pekin to Madrid?
8. Name three principal cities in China, three in India, three in Asia Minor.
9. Name five principal rivers of Africa.
10. In what part of Africa are its ranges of Mountains? Describe them.
11. What productions of Africa form articles of commerce?
12. Bound Uraguay, Paraguay, Bolivia.
13. Name five large rivers of South America and say in what direction they flow.
14. Name the capitals of each of the countries of South America.
15. How could one go by water from Montevideo to Pittsburgh?
16. Bound Kansas, Arkansas, Dacota.
17. How could one go by water from New York to Chicago?
18. Name five large rivers of British North America.
19. Describe the boundary line between British North America and the United States.
20. What States and countries would one pass in sailing from Milwaukie to San Francisco.

ENGLISH GRAMMAR.

1. State the different ways of forming the plural in English nouns.
2. Give the meaning and derivation of the following words: virtuously, autobiography, hospitable, journalist, circumvolution, disenthrall, inconsequent, interlineation, dissatisfy, quadrennial, worthlessness, contemporaneous.
3. Use the word *iron*, (*a*) as an adjective; (*b*) as a noun; (*c*) as a verb.

4. Use the word *for*, (*a*) as a conjunction; (*b*) as a preposition.
5. Explain the meaning of the terms *person*, *mood*, and *tense*.
6. Parse the italicized words in the following: I know *him as myself: for from our infancy* we have conversed, and *spent* our hours *together*.
7. Define the following terms: *vowel*, *consonant*, *diphthong*, *syllable*.
8. In order to conjugate a verb, what parts must be known?
9. Classify the so-called irregular or strong verbs.
10. Write a sentence in which a phrase or a clause is the subject of a verb.
11. Point out the errors in the following sentences:

(*a*) He laid down in the first place he come to.
(*b*) He has not studied like we did.
(*c*) I had rather go than stay to hear you three persons quarrel with each other.
(*d*) I shan't tell you whom I think is the best man of the two.
(*e*) By no excuse you couldn't justify such conduct.
(*f*) Either in the four first of the class were good scholars.
(*g*) Since you were here, I went out to walk every day.
(*h*) Who did you expect to have seen at the hall?
(*i*) He don't mind me; but I will be sorry to punish him.
(*j*) The third and fifth chapter is very entertaining.
(*k*) The assembly consist of forty-seven members, two elected by nineteen districts, and three by each of the other districts.
(*l*) Be prudent; without which you will get into trouble.

12. Turn into grammatical prose the following verses, placing the words in the natural order, and supplying ellipses:

> Meanwhile the south-wind rose, and with black wings
> Wide hovering, all the clouds together drove
> From under heaven; the hills to their supply
> Vapor, and exhalation dusk and moist,
> Sent up amain; and now the thicken'd sky
> Like a dark ceiling stood; down rush'd the rain
> Impetuous, and continued till the earth
> No more was seen; the floating vessel swum
> Uplifted, and secure with beaked prow
> Rode tilting o'er the waves; all dwellings else
> Flood overwhelm'd, and them with all their pomp
> Deep under water roll'd; sea covered sea,
> Sea without shore.

13. What is meant by an *exception?* give several instances of exceptions to rules of grammar.
14. Give a list of Adverbs of irregular comparison.
15. What is meant by one word governing another?

LATIN.

Di, quibus imperium pelagi est, quorum aequora curro,

Vobis laetus ego hoc candentem in litore taurum
Constituam ante aras.

Translate, divide into feet, and give rules for quantities in the first line.

Compare *similis, acer, juvenis, fortis, tenax, diu, male.*

Give all the participles, infinitives and forms of second person singular of *gaudeo* and *fero.*

Translate into Latin:

1. Are they deserving of praise who have done these things? (No.)
2. He says that he has not many slaves.
3. He has come to ask who commands the army.
4. It cannot be denied that we all lose much time.
5. There were some who promised to remain at Rome.
6. Give these two books to your friend and ask him to set out to-day for Rome.

GREEK.

(*N. B.—All the Greek words must be written with the accents.*)

I. GRAMMAR.

1. What letters are called *smooth mutes, labial mutes?*—Make the required euphonic change in συν-γενης, ἰδ-τε, τετριβ-ται.—Define the terms *perispomenon, metathesis, proclitic,* giving an example of each.

2. Form the gen. and dat. in all numbers of μοῦσα, ἀνώγεων, πόλις, μήτηρ.—Decline ταμίας, πολύς through the sing.; βοῦς, καλλίων through the plural.—Form the gen. and dat. sing. in all genders of τιμάων (giving both the contracted and the uncontracted forms), δούς, λελυκώς.—Compare σεμνός, ὀξύς, σώφρων, καλός, ὀλίγος.—Decline σύ, τίς through the sing. and dual; ὅστις, οὗτος through the plural.

3. Give synopses through all the moods of the aor. mid. and aor. pass. of λύω, and the aor. act. of λείπω; synopsis of the pres. pass. of φιλέω, with inflection of the imperf. pass.; synopses of the pres. act. of τίθημι, and the 2 aor. of ἵστημι, with inflection of the indic. of each.—Give the principal parts of στέλλω, γίγνομαι, φημί, ὁράω, λαμβάνω, φαίνω.

II. COMPOSITION.

1. He came that he might stop this.
   ἔρχομαι. παύω.
2. Would that it had not happened!
   γίγνομαι.
3. They said that they intended to write.
   μέλλω. γράφω.

TERM EXAMINATIONS—GENERAL COURSES.

I. HISTORY AND POLITICAL SCIENCE.

I. ANCIENT HISTORY—PROFESSOR RUSSEL.

1. Into what races are mankind divided ethnologically?
2. Into what families are the languages of Europe and Asia divided philologically?
3. To what race of mankind do the Chinese belong and to what family does their language belong?
4. About how far back do Chinese records extend?
5. What attention have the Chinese paid to the history of their nation?
6. When did Confucius live? What was the character of his teaching?
7. What nations successively conquered China, and at about what time? Of what nationality is the present ruling race?
8. To what race do the people of Hindoostan belong, and to what family does their language?
9. What attention did the East Indians pay to history? Describe their intellectual character and habits.
10. What have been the prevailing religions of the East Indians? State their doctrines.
11. By what nations has Hindoostan been successively conquered?
12. Of what race were the Babylonians?
13. How far back can we trace Babylonian history?
14. Of what nationality were the Assyrians?
15. What memorials of Babylonian and Assyrian history remain?
16. Describe Assyrian civilization.
17. By what nation were Babylon and Assyria conquered?
18. What was the extent of the Persian monarchy under Darius Hystaspis?
19. How far back does our knowledge of Egypt extend? To what races did the Egyptians belong?
20. What means have we of knowing Egyptian history and civilization? Describe their civilization.
21. By whom were Persia and Egypt finally conquered, and of whose empire did they become a part?
22. To what races did the Hellenes belong? Which were the two principal sub-races?
23. What was the general character of the Spartan government? What was the character of the Athenian government? Explain as to each.

2. ROMAN HISTORY—PROFESSOR RUSSEL.

I.

1. Who were the original Italians?
2. What other people belonged to the same family?
3. After the Italians came into Italy, into what nations were they divided?

II.

1. At what date does the authentic history of Rome begin?
2. What authority have we for facts said to have occurred before that period?

III.

1. What was a Roman gens? a curia? a century? a tribe?
2. Under what two great divisions were the free inhabitants of Rome classed?
3. What rights had they respectively?
4. What means of obtaining privileges did the unprivileged class several times use?

IV.

1. What principle in regard to the possession of land is conspicuous in Roman history?
2. How did the small proprietors of land lose it?
3. What was the effect on the prosperity of Rome, of the want of small landed proprietors?
4. What was the object of the agrarian law?
5. Who were the Gracchi, and what did they accomplish?

V.

1. What was the prevailing policy of Rome with respect to foreign nations?
2. By what wars did Rome extend her power?

VI.

1. What was the effect of foreign conquest on the prosperity of the Romans?
2. How did it affect their mode of life, their independence, their morality?

VII.

1. In the time of Marius who were Roman citizens?

VIII.

1. What were the original causes of the loss of Roman liberty?
2. Who first destroyed Roman liberty?
3. After him what form of government did Rome need?
4. Between what persons was the struggle for supreme power?

3. HISTORY OF THE ROMAN EMPIRE—PROFESSOR RUSSEL.

1. What were the powers of the Emperor Augustus and of his immediate successors? Whence were those powers derived?
2. After the time of the Antonines, what body virtually appointed the Emperor? What was the origin of that body, and how large was it?

3. What change did Constantine the Great make in the imperial residence and in the constitution of the empire?

4. By whom and when was the empire divided into two parts—the Eastern and the Western? Give the limits of the two parts. What was the effect of that division on the decline of the empire?

5. How and when did the Roman Empire of the West become extinct?

6. To what principal causes was the decline of the Roman empire due?

7. How were the Goths divided? Where did they come from? Where were they when they first appeared in Roman history? What Roman emperor was defeated by them and when? When and under whom did they finally conquer Italy? How long did they keep possession of it?

8. Who were the Franks and where did they live?

9. Who were the Alemanni? Where did they live?

10. Who were the Huns? Describe the effect of their emigrations on the empire?

11. Where did the Vandals come from? Who was their most distinguished leader? Where did they finally settle?

12. Where did the Lombards come from? When and under whom did they conquer Italy? State particularly how Italy was divided between them and the Exarchs.

13. Who was Pepin le Bref? In what way and when did he become king of France? What return did he make for the decision in his favor? What present power rests on this transaction?

14. Who was Mohammed? Give date of the Hegira. Give his character, his doctrines and his purpose.

15. What was the origin of the Ottoman empire? What was its extent in Asia? On what occasion did the Ottomans enter Europe?

4. MEDIÆVAL HISTORY—PROFESSOR RUSSEL.

I.

1. Describe the Celtic character and religion.
2. What was the result of the Roman conquest of Gaul?

II.

1. Whence did the invaders come who conquered the Gallo-Romans? Name the different nations and say where they settled.

III.

1. How many dynasties of French kings have there been?
2. Name them and the period of the duration of each.

IV.

1. How did the first dynasty come to an end?
2. Where was Neustria? Where was Austrasia?

V.

1. Who was the first Carlovingian king?
2. How and when did he become king? Describe the transaction, showing the advantages on both sides.

3. Describe the character of Charlemagne. What became of his kingdom and when?

VI.

1. Describe the territory and the authority of the earlier kings of the third dynasty.
2. By whom were they opposed? Describe the power of these opponents.
3. Which king of France first extended his authority over the whole country?

VII.

1. To what did the bishop of Rome owe his supremacy over the other bishops?
2. What was the foundation of the temporal power of the Popes?
3. What claim did the Popes make in relation to the government of foreign nations? State the foundation of this claim and on what ground it was resisted.
4. Describe the decisive struggle between the Popes and the temporal sovereigns and the result.

VIII.

1. Describe the feudal system.
2. Mention the various services which were due from the vassal to his lord.
3. Describe the mode of life of a feudal baron.
4. What were the good effects of the system?
5. How did the system operate on the lower classes?
6. How did feudalism come to an end?

IX.

1. What attempts were made under the Valois kings to secure popular liberty?
2. Why did they fail?
3. What was the tendency of the monarchy under those kings? Describe the progress of royal power.

5. MODERN HISTORY—PRESIDENT WHITE.

1. Give some account of Brunelleschi and his connection with the history of Florentine Art.
2. Sketch the cause of the decline of Art after Michael Angelo and Raphael.
3. Give a brief account of the Colloquies of Erasmus. Name some of them. State the resemblances between Erasmus and Voltaire.
4. Give the main features of the struggle between the Obscurantists and Humanists, with an account of the part taken by Pfefferkorn.
5. Give the dates of Charles V's accession to the thrones of Spain and Germany. What was his title as king of Spain?
6. Give a short account of the attempt, made by Charles V on

one side and Francis I on the other, to secure the alliance of Henry VIII.

7. What was the league of Schmalkalden? What was the Peace of Passau, and when?

8. State the effect of the war between Charles V and Joseph I on Protestantism in Germany.

9. Give the names of Loyola's principal associates in founding the Order of the Jesuits.

10. State the part taken by Sainez at the Council of Trent.

11. Give the date of the beginning of the Council of Trent. Where is Trent?

12. Describe the connection of Wallenstein with the Thirty Years War.

13. What is Cardinal Richelieu's relation to the history of religious toleration?

14. What struggle was going on in England at the time of the Fronde?

15. Name the two religious orders founded by St. Vincent de Paul.

16. Name the chief political opponents in Europe of Louis XIV. What were "Les Chambres de la Réunion"?

17. Give the main points in the connection of John Law with the French Government.

6. FRENCH HISTORY—PRESIDENT WHITE.

1. What is Mignet's remark regarding the transition from the classic literature of the time of Louis XIV to the philosophic literature of the time of Louis XV?

2. Give a general statement regarding Voltaire's life and influence.

3. Give some idea of the method of attacking old institutions in France taken by Montesquieu in the Persian Letters.

4. Give Rousseau's idea of representation in a republic as stated in the treatise on the Social Contract.

5. Name some of the principal Encyclopædists. Why were they so called? What relation do they bear in the history of French thought to Voltaire and Rousseau?

6. What was Jansenism?

7. Who was Maurepas? What were his ideas regarding the formation of the Ministry?

8. State the main agencies through which the American Revolution influenced the French.

9. Up to what period of the French Revolution was this influence exercised and why did it cease?

10. What was the great preliminary question regarding the States General to be decided before the meeting?

11. What as soon as it had met?

12. State Burke's objection to the way the States General was composed and give your own opinion.

7. ENGLISH HISTORY—PROFESSOR GOLDWIN SMITH.

1. Of what races is the British nation composed? In what districts does each race prevail?

2. What were the powers of the Saxon kings? Was the monarchy hereditary or elective?

3. What political struggle took place in the reign of Edward the Confessor?

4. Give the leading features of the policy of William the Conqueror in Church and State.

5. For what principle did Anselm contend against Henry I? What was the issue of the contest?

6. Of what tendency of the feudal system is the reign of Stephen an example?

7. What was the question at issue between Henry II and Thomas à Becket? What was the immediate, and what the ultimate result of the struggle?

8. State the good and bad features of the character of Richard I, connecting them with the state of morality and civilization in his time.

9. What was the most important article of the Great Charter?

10. What new religious orders appeared in England in the time of Henry III? What led to their foundation?

11. Give an account of the statute of Mortmain.

12. What economical crisis marked the reign of Edward III? To what legislation did it lead?

13. What led to the insurrection of Wat Tyler?

14. What were the political consequences of the Wars of the Roses?

15. Why is the reign of Henry VII said to mark the commencement of Modern History?

16. How far was the Reformation carried in the reign of Henry VIII?

17. What was the policy of the Protector Somerset?

18. Account for the religious reaction at the accession of Mary.

19. What led to the development of the English drama in the age of Elizabeth?

7. POLITICAL ECONOMY—PROFESSOR WILSON.

[*Specimens of sets of questions, twenty in all, drawn by lot by each student.*]

NO. 4.

4. What is utility or intrinsic value? What objects have such value? Has the same article different intrinsic values? How is this?

24. Who are *traders?* What is their relation to each of the two factors of wealth, quantity and value?

44. What has been the law or ratio of increase as between population and distributive wealth *up to this time?* Is there any reason to suppose that that ratio will ever be different?

64. What is simple barter? Show the advantages of a circulating medium as a labor-saving machine.

84. Explain the use of money as a *machine* for exchange. Why are gold and silver preferable to other metals?

NO. 12.

12. What is *price* and how does it differ from value? Show the error of Mill's doctrine [B. I. Chap. I. § 3.] that price results only from limitation of supply. Explain $P=V+(d-s)$.

32. In what sense is land a "force of nature," to what extent a "machine"? Regarded as a machine, what are the "forces" that it utilizes?

52. Show that the rate of wages will increase with the intelligence of the laborers. Does this apply to the educated few only or to the masses as well?

72. State and explain the principal ways in which the cost of transportation and exchange can be diminished.

92. State the difference, in case of loss by the sinking of a ship and such like calamities, between the loss of a sum in coin and that of the same sum in bills (1) to the parties themselves and (2) to the community.

8. PHILOSOPHY OF HISTORY—PROFESSOR WILSON.

[*Specimens of the sets of questions furnished to each student by lot.*]

NO. 2.

2. What are the three agents that control the causes and results of history? What are the different theories of their relative influence?

22. Why may we not expect any high civilization in extreme latitudes? What is the effect of elevation above sea level on civilization?

42. What influence has intellectual culture on religion with reference to (1) fetichism, (2) polytheism and (3) monotheism?

62. Describe the circumstances of race and physical position that made Athens the place of origin of modern civilization.

NO. 8.

8. Compare the value of the geological and the philological indications as to man's early conditions.

28. What size, in a city, is regarded as most favorable to civilization? What are the *physical* effects of increase beyond this limit?

48. How were the Chinese written characters formed? How do they differ from the polysyllabic words of Indo-European languages?

68. What circumstances, historically, gave the Christian religion an advantage over the heathen religions of the time?

9. AMERICAN LAW AND POLITY—PROFESSOR WILSON.

[*Forty lectures in all.—Sub-divisions of the Course.*]

I. The Constitution of the United States. Lects. I—XII.
II. International Law. Lects. XIII—XVII.
III. Municipal Law. Lects. XVIII—XX.
IV. Laws Relating to Property. Lects. XXI—XXXII.
V. Criminal Law. Lects. XXXIII—XXXVI.
VI. Legal Maxims. Lects. XXXVII—XL.

[*Specimens of subjects, forty in all, drawn by lot one for each student.*]

II.—The Continental Congress and Articles of Confederation.
IX.—Restraints upon Congressional Legislation. Art. I. Sec. 9.
XIV.—The relation of Nations in times of Peace.
XVII.—Rights and Liabilities in time of War.
XVIII.—Origin and Development of National Codes.
XXI.—Nature and Kinds of Property. Eminent Domain.
XXV.—Real Estates by Contracts among the living.
XXVII.—Contracts for Personal Property.
XXXI.—Agency and Partnership.
XXXIII.—What constitutes a Crime. Crimes against Governments.
XXXVIII.—Maxims relating to the Judiciary.
XL.—Maxims fundamental to all Law.

II. ANCIENT LANGUAGES.

I. LATIN—PROFESSOR PECK.

I. HORACE—ODES, I, 2, 30–52.

1. Translate:—

Tandem venias precamur
Nube candentes humeros amictus,
Augur Apollo;
Sive tu mavis, Erycina ridens,
Quam Jocus circum volat et Cupido;
Sive neglectum genus et nepotes
Respicis, auctor,
Heu nimis longo satiate ludo,
Quem juvat clamor galeaeque leves
Acer et Mauri peditis cruentum
Vultus in hostem;

Sive mutata juvenem figura
Ales in terris imitaris, almae
Filius Maiae, patiens vocari
    Caesaris ultor:
Serus in caelum redeas diuque
Laetus intersis populo Quirini;
Neve te nostris vitiis iniquum
    Ocior aura
Tollat: hic magnos potius triumphos,
Hic ames dici pater atque princeps,
Neu sinas Medos equitare inultos,
    Te duce, Caesar.

2. Who are meant by *Erycina ridens*, *auctor*, *filius Maiae*, and why are they introduced here? State the occasion and the thought of the Ode.

3. Construe *populo*, *vitiis*, *dici*. Compare *acer*, *juvenem*, *diu*, *ocior*. Give the derivation of *mutata*, *ales*, *almae*, *pater*. Form diminutives to *vultus*, *populo*, *filius*, and to the comparative of *magnos*.

4. Draw a map of Italy, and locate upon it *Anio*, *Antium*, *Roma*, *Tarentum*, *Tibur*, *Venusia*.

5. Translate, and make full metrical schemes of the lines
(1) Dignum laude virum Musa vetat mori.
(2) Ille mi par esse deo videtur.
(3) Doctrina sed vim promovet insitam.
(4) Neque hic lupis mos nec fuit leonibus.

II. DIALOGUS DE ORATORIBUS, IX.

1. Translate:—

Nam carmina et versus, quibus totam vitam Maternus insumere optat (inde enim omnis fluxit oratio), neque dignitatem ullam auctoribus suis conciliant neque utilitates alunt; voluptatem autem brevem, laudem inanem et infructuosam consequuntur. licet haec ipsa et quae deinceps dicturus sum aures tuae, Materne, respuant, cui bono est, si apud te Agamemnon aut Iason diserte loquitur? quis ideo domum defensus et tibi obligatus redit? quis Saleium nostrum, egregium poetam vel, si hoc honorificentius est, praeclarissimum vatem, deducit aut salutat aut prosequitur? nempe si amicus eius, si propinquus, si denique ipse in aliquod negotium inciderit, ad hunc Secundum recurret aut ad te, Materne, non quia poeta es, neque ut pro eo versus facias; hi enim Basso domi nascuntur, pulchri quidem et iucundi, quorum tamen hic exitus est, ut cum toto anno, per omnes dies, magna noctium parte unum librum excudit et elucubravit, rogare ultro et ambire cogatur, ut sint qui dignentur audire, et ne id quidem gratis; nam et domum mutuatur et auditorium exstruit et subsellia conducit et libellos dispergit. et ut beatissimus recitationem eius eventus prosequatur, omnis illa laus intra unum aut alterum diem, velut in herba vel flore

praecepta, ad nullam certam et solidam pervenit frugem, nec aut amicitiam inde refert aut clientelam aut mansurum in animo cuiusquam beneficium, sed clamorem vagum et voces inanes et gaudium volucre.

2. Origin, exact meaning, and syntax of *cui bono*. Customs alluded to in *deducit, salutat, prosequitur*. Etymology and precise force of *ultro*. Construction of *id, gratis*.

3. History, circumstances and influence of the *recitationes*.

4. Outline of the Dialogus. Prominent peculiarities of its style, and discussion of question as to its authorship.

5. Characteristics and explanation of the prevailing literary style of the age.

III. PLINY—EP. II, I.

1. Translate:—

Post aliquot annos insigne atque etiam memorabile populi Romani oculis spectaculum exhibuit publicum funus Vergini Rufi, maximi et clarissimi civis, perinde felicis. Triginta annis gloriae suae supervixit. Legit scripta de se carmina, legit historias et posteritati suae interfuit. Perfunctus est tertio consulatu, ut summum fastigium privati hominis impleret, cum principis noluisset. Caesares quibus suspectus atque etiam invisus virtutibus fuerat evasit, reliquit incolumem optimum atque amicissimum, tamquam ad hunc ipsum honorem publici funeris reservatus. Annum tertium et octogesimum excessit in altissima tranquillitate, pari veneratione. Usus est firma valetudine, nisi quod solebant ei manus tremere, citra dolorem tamen. Aditus tantum mortis durior longiorque, sed hic ipse laudabilis. Nam cum vocem praepararet acturus in consulatu principi gratias, liber quem forte acceperat grandiorem et seni et stanti ipso pondere elapsus est. Hunc dum sequitur colligitque, per leve et lubricum pavimentum fallente vestigio cecidit coxamque fregit, quae parum apte collocata reluctante aetate male coiit. Huius viri exequiae magnum ornamentum principi, magnum saeculo, magnum etiam foro et rostris attulerunt. Laudatus est a consule Cornelio Tacito: nam hic supremus felicitati eius cumulus accessit, laudator eloquentissimus.

2. Derivation of *dum*, and its successive meanings and constructions. Changed meaning of *privatus* under the empire. To whom do *Caesares* and *optimum* refer?

3. History of the word *Caesar* as a title. Prominent features of a *funus publicum*, and of a *laudatio funebris*. Misuse sometimes made of the latter.

4. Careers of Verginius Rufus and of Cornelius Tacitus, and their relations to Pliny.

5. Character of the Latinity and the literature of the Silver Age. Cicero's and Pliny's letters in regard to their style and historical value.

IV. LUCRETIUS—II, 1157–1174.

1. Translate:—

Praeterea nitidas fruges vinetaque laeta
sponte sua primum mortalibus ipsa creavit,
ipsa dedit dulcis fetus et pabula laeta;
quae nunc vix nostro grandescunt aucta labore,
conterimusque boves et viris agricolarum,
conficimus ferrum vix arvis suppeditati:
usque adeo parcunt fetus augentque labore.
iamque caput quassans grandis suspirat arator
crebrius, incassum manuum cecidisse labores,
et cum tempora temporibus praesentia confert
praeteritis, laudat fortunas saepe parentis
et crepat, anticum genus ut pietate repletum
perfacile angustis tolerarit finibus aevom,
cum minor esset agri multo modus ante viritim.
tristis item vetulae vitis sator atque vietae
temporis incusat momen caelumque fatigat
nec tenet omnia paulatim tabescere et ire
ad capulum spatio aetatis defessa vetusto.

2. Derivation and analogues in cognate languages of *fruges*, *fetus*, *pabula*, *caput*, *manus*, *genus*, *pietas*, *modus*, *caelum*, *capulus*. Unusual forms and constructions. Connection of this passage with the philosophy of Lucretius.

3. Biography of Lucretius; his personal character as gathered from his poem; his relations to his predecessors and to his successors; peculiarities of his versification; characteristics of his Latinity; an outline of his cosmical, theological, and ethical notions.

2. GREEK—PROFESSOR FLAGG.

I. PERSIANS OF AESCHYLUS.

I. *vv.* 1–139. Designate the principal divisions of this passage, and state by whom and in what manner each was probably performed. Give the technical name of the part comprising *vv.* 93–100. What difference in tone is observable between what immediately precedes and what follows this part?—Comment on οἵτε (16): στεῦται (49): ἄκμονες (51): περσέπτολις (65): ἔσσεται (syntax) 121.—Explain the metrical peculiarity of *v.* 32 (*cf.* 152). —*Translate vv.* 12–20 and 101–113.

II. *Translate vv.* 447–464. Explain the mood and tense of ἐκσωζοίατο (451) and τράποιντο (459). Scan *vv.* 447–448.—*Translate vv.* 739–752, and scan *v.* 741.

III. *vv.* 800–828. Explain the negative particles in *v.* 802. How does Darius say that he arrives at a knowledge of what he narrates in the following lines?—Explain the mood and tense of ἐκχέῃ (826).—Give the date of the historical event referred to in this passage. Show the significance of Δωρίδος (817.)

Mention any instances of tragedies with historical subject earlier than the *Persians*. By what means is the present play rendered Panhellenic (not exclusively Athenian) in spirit? How has Aeschylus contrived to give it the usual religious character? In what did the ὕβρις of Xerxes consist?

II. AGAMEMNON OF AESCHYLUS.

I. *Translate* (*a*) *vv.* 97–103: (*b*) 145–155: (*c*) 164–178: (*d*) 252–257.—Designate the main divisions of the Parodos, give a synopsis of the contents of each and show their bearing on one another. What state of mind on the part of the Chorus is exhibited by the Parodos as a whole?—Explain the mythological allusions in passage (*c*). Describe the ethical doctrine on which the dynasty of Zeus, as conceived by Aeschylus, is founded. What are the functions of the Aeschylean Μοῖρα?

II. *Translate* (*a*) 379 (ἔστω)–386: (*b*) 456–465 (ἀμαυρόν): (*c*) 700–708: (*d*) 750–762: (*e*) 987–994.—Point out the transitions of thought in the first Stasimon, and show how they accord with the feelings of the Chorus. How is the second Stasimon connected with the first, and each Stasimon with the Epeisodion preceding it? Wherein does the third Stasimon exhibit a different mode of reflection from the other two?—State fully the divergence from the popular belief announced in passage (*d*), with (*a*) and (*b*), etc. How far is the notion of a family curse reconcilable with Aeschylus' system of ethics? Give the Greek words which may be regarded as technical terms in the expression of the doctrine.

III. *Translate* (*a*) 925–934; (*b*) 1177–1190: (*c*) 1523–1536.—Give the leading traits in the character of Agamemnon as drawn by Aeschylus.—What artistic purposes are served by the scene between Cassandra and the Chorus? Remark on its relation to the unity of the tragedy.—Give the substance of Clytaemnestra's defense, and that of the Chorus' reply. Explain *vv.* 1535–6. What are the subjects of the second and third plays of the trilogy? State the grounds of the final reconciliation.

IV. From what verbs and where formed are ἐπίανεν (276): ὑπερ-άρας (786): πραθέντα (1041): ἔφευξας (1308): ἔλακες (1426): ἀλύξειν (1615)?

III. PLATO'S LACHES.

I. 181 A, B. What does ὅτι (before ὀρθοῖς) connect?—ὅτι before οἰκεῖα?—Where is ἀφίεσο formed?—Explain the case of ὧν (σὺ νῦν ἐπαινεῖ): the meaning of καὶ (σὺ δέ).—*Translate from* Εὖ γε *as far as* σοι εἶναι—Characterize Lysimachus from this passage and 180 D, E, etc.

II. *Translate* 192 E, 193 A.—Where is ἐκτήσεται formed?—Explain αὕτη (193).—Where is the proposition antithetic to (εἰδότα)

μέν?—What is the fault in Laches' second definition of courage? What was the fault in his former one?

III. 196 C, D. Explain the construction of οἴεται: the force of αὐτὴν (ταύτην τὴν ἐπιστήμην). *Translate as far as* οὕτως ἔλεγες.—Wherein is the definition of Nicias proved to be faulty? To what important Socratic doctrine does the refutation of it lead?

How may the assumed time of this dialogue be approximately determined? Show the appropriateness of the selection of Nicias and Laches as interlocutors, with reference to their personal traits. How is Socrates represented in comparison with the two generals (see especially 188 C, etc.)?

IV. DEMOSTHENES (I. II. III. IV. VIII).

I. Ol. *I*, § 28.—*Translate the section.*—What faults in Athenian disposition and policy are summed up in this tripartite division of ἅπαντας?—Explain εὔθυναι as here used.—What may be said of the perorations of the Demosthenic speeches in general?

II. Ol. *III*, §§ 8–9.—Expand τῆς περιστάσης ἂν ἡμᾶς αἰσχύνης into a clause.—Explain the construction of ποιήσειν (§ 9).—What were the relations of the Athenians with the Thebans and the Phocians at this time?—*Translate* § 9.

Why may the events of the Olynthian war be said to form a period in the public career of Demosthenes?

III. *Chers.* §§ 5 and 6.—*Translate and analyze this period.*—Give a brief account (with date) of the negotiation of the Peace here spoken of.—Specify some points of which the treatment in this oration (§§ 13, 18, 35, 49, 51, 59, 61, 66, 76, 77,) is noticeably different from that adopted in the early speeches, and explain the difference of tone.

V. (A.) PINDAR.

Translate (*a*) Oylmp. I, 17 (ἀλλά)–29: (*b*) Nem. II, 13–18: (*c*) Isthm. I, 28–40.—Note, in (*a*), the transition to the mythical part and the words that have been previously introduced to prepare for the subject of it. What is there in the handling of this mythus that is characteristic of Pindar?—Show, in (*c*), the significance of coupling the two heroes named in the mythus, giving the obvious (17), and the (as is conjectured) remoter reason.

(B.) THEOCRITUS.

Translate (*a*) I, 39–44: (*b*) XI, 38–43: (*c*) XV, 132–138.—Explain (etymologically, by comparison with the Attic) the following dialectic forms:—ᾡδήκαντι (I, 43): τράφω, νεβρώς (XI, 40): ἔχοισα (XV, 131): οἰσεῦμες (133).—What are the merits that chiefly distinguish Theocritus among the writers of the Alexandrine period?

III. MODERN LANGUAGES.

I. FRENCH—PROFESSORS RŒHRIG AND STEBBINS.

Translate the following into French:

1. The bookseller has good books, and the carpenter has bad ones. Here are two. Which do you desire?

2. I am not satisfied with those which I have read; can you not lend me a better one?

3. There are ten trees in my garden, and fourteen in my brother's, how many have you in yours?

4. I have only two, and I gave them to him, and I cannot sell you any.

5. Wine is good for the sick; milk is better for you and me, and water is excellent when one is thirsty.

6. Has the girl any more silk? I need some in order to mend my silk stockings.

7. She bought some this week, but used some in order to mend my hat, and now she has no more.

8. Who asked for my mother to-day? The painter, whom you know, asked if she was at home; I do not know what his name is.

9. It is not suitable for us to go out when it rains, nor to remain at home when it is fine weather.

10. In order to learn French you must study and write many exercises.

11. At what hour did your brother go to bed this evening? We could not speak to him, for he went away too early.

12. Are you General Smith's oldest daughter? No, sir, I am not.

13. Has anything happened to them? We did not see them at church this morning.

14. Why do you not make haste? It is a quarter before nine, and you are to take your little brother to school.

15. I have eaten nothing the whole day, but I am neither hungry nor thirsty.

16. Colonel G. has money and he buys beautiful paper and French engravings. It does not become him to reproach me with my conduct.

17. Those apple trees are mine, these are my wife's. Whose are the flowers which you are carrying from market?

18. They belong to my shoemaker. He has just bought them this afternoon and now is going to put them in his child's garden.

19. If you have heard of your son, it is important that you write to him and tell him not to marry that girl; he ought not to go near her.

20. I doubt that he goes to England. I do not believe that he has any friends there, and I do not think that one can be without friends in a foreign country.

21. As soon as he had said this, he rose and spoke to them, and

said, "Do not injure him, bring him to me, and remember what he did to you when you had few friends and needed brave ones."

22. Whatever I may do, I cannot help laughing when that boy comes near me; the sleeves of his coat are six inches too short, and he wears a white cloth hat and he carries a cotton umbrella.

23. Take care not to lose your purse. I am afraid you have left it in your room, and you must pay your tailor to-morrow seventeen dollars for your half-dozen shirts.

II. SECOND YEAR—SECOND TERM.—PROFESSOR CRANE.

I. CORNEILLE'S CID.

1. *Translate:*

Les Maures vont descendre; et le flux et la nuit
Dans une heure à nos murs les amènent sans bruit.
La cour est en désordre, et le peuple en alarmes;
On n'entend que des cris, on ne voit que des larmes.
Dans ce malheur public mon bonheur a permis
Que j'ai trouvé chez moi cinq cents de mes amis,
Qui, sachant mon affront, poussés d'un même zèle,
Se venaient tous offrir à venger ma querelle.
Tu les as prévenus; mais leurs vaillantes mains
Se tremperont bien mieux au sang des Africains.
Va marcher à leur tête, où l' honneur te demande:
C'est toi que veut pour chef leur généreuse bande.
De ces vieux ennemis va soutenir l'abord,
Là, si tu veux mourir, trouve une belle mort;
Prends-en l' occasion, puisqu' elle t' est offerte;
Fais devoir à ton roi son salut à ta perte:
Mais reviens-en plutôt les palmes sur le front.

2. Give principal parts of all irregular verbs in the above passage.

3. Parse *Tu les as prévenus*, (line 9), and give rule for agreement of past participle in compound tenses.

4. Parse *c'est toi que*, (line 12). Parse *Fais devoir à ton roi son salut*, (line 16), and illustrate this construction by an original example. Give etymology of *bonheur*, (line 5).

5. Divide the first three lines into feet, and indicate the cæsura. What are the various names applied to this metre, and why?

6. State what you know about the sources of this play.

II. LA MAISON DE PENARVAN, PAR JULES SANDEAU.

a. 1. *Translate:*

PAUL (*se levant aussi*). Ah! ma cousine, si vous le prenez ainsi, nous ne pourrons jamais nous entendre. Il y a entre nous une révolution, un monde écroulé, un abîme . . . et nous ne parlons pas la même langue.

RENEE. C'est tant pis pour vous, monsieur de Penarvan!

PAUL. Et que m'importent les destinées de la maison de Penarvan? Est-ce que je la connais? Qu' a-t-elle fait pour moi? Votre père, anticipant sur la mort, avait jugé plaisant de rayer le mien du nombre des vivants; vous, ma cousine, vous ne saviez pas même que je fusse de ce monde, et il a fallu qu'un hasard se chargeât de vous l'apprendre . . . . Vous êtes accourue; pourquoi? pour rapprocher les débris de notre famille? pour m'apporter l'oubli du passé? Allons donc! Vous n'êtes venue que pour préserver cet illustre nom de la souillure d'une mésalliance . . . une mésalliance pour vous, mais non pour moi, qui me fais gloire d'être de mon temps et ne suis d'ailleurs ni duc ni marquis.

2. Parse *pis* (line 5), *que* (line 6), *est-ce que* and *qu'* (line 7), *qui me fais* (line 15).

3. Explain mood of *fusse* (line 10), and *chargeât* (line 11).

b. 1. Explain the accent in: *à, là, dû, tû, mâle, château, état, finît.*

2. Write the first person singular, present indicative of *se promener, posséder, appeler, jeter,* and the feminine of *premier* and *complet.*

3. Translate line 1021 of the Cid: *Justes cieux! me trompé-je encore à l'apparence. Ou si je vois enfin mon unique espérance?* Explain *trompé-je.*

c. Translate into French the following sentences:

1. When I shall have caused myself to be killed, perhaps she will regret me.
2. I have seen them (masc.) strike.
3. I have seen them (fem.) struck.
4. I have heard her sing a French song.

III. SECOND YEAR—THIRD TERM.—PROFESSOR CRANE.

I.

1. *To be translated at sight:*

MONTAIGNE.

On sait avec quelle constance il avait étudié les grands génies de l'ancienne Rome, combien il avait vécu dans leur commerce et dans leur intimité. Doit-on s'etonner que son ouvrage porte, pour ainsi dire, leur marque, et paraisse, du moins pour le style, écrit sous leur dictée? Souvent il change, modifie, corrige leurs idées. Son esprit, impatient du joug, avait besoin de penser par lui-même; mais il conserve les richesses de leur langage et les formes de leur diction. L'heureux instinct qui le guidait lui faisait sentir que, pour donner à ses écrits le caractère de durée qui manquait à sa langue, trop imparfaite pour être déjà fixée, il fallait y transporter,

y naturaliser en quelque sorte les beautés d'une autre langue, qui, par sa perfection, fût assurée d'être immortelle; ou plutôt, l'habitude d'étudier les chefs-d'œuvre de la langue latine le conduisait à les imiter. Il en prenait à son insu toutes les formes, et se faisait Romain sans le vouloir. Quelquefois, réglant sa marche irrégulière, il semble imiter Cicéron même. Sa phrase se développe lentement, et se remplit de mots chosis qui se fortifient et se soutiennent l'un l'autre dans un enchaînement harmonieux.—*Villemain,* 1790–1867.

2. Give principal parts of ***sait, vécu, doit, paraisse, écrit, sentir, fallait, conduisait, remplit.***
3. Parse ***paraisse, fût assurée.***
4. Parse ***quelle, lui faisait sentir que.***
5. Derivation of ***durée, insu.***

II.

1. *To be translated at sight:*

A QUOI DOIVENT TENDRE LES EFFORTS DU SAGE.

C'est l'erreur que je fuis: c'est la vertu que j'aime.
Je songe à me connaître, et me cherche en moi-même.
Sur cette vaste mer qu'ici-bas nous courons,
Je songe à me pourvoir d'*esquif et d'avirons,
A régler mes désirs, à prévenir l'orage,
Et sauver, s'il se peut, ma raison du naufrage.
C'est au repos d'esprit que nous aspirons tous;
Mais ce repos heureux se doit chercher en nous.
Un fou rempli d'erreurs, que le trouble accompagne,
Est malade à la ville ainsi qu'à la campagne.
De nos propres malheurs auteurs infortunés,
Nous sommes loin de nous à toute heure entraînés.
A quoi bon ravir l'or au sein du nouveau monde?
Le bonheur tant cherché sur la terre et sur l'onde
Est ici, comme aux lieux où mûrit le coco,
Et se trouve à Paris de même qu'à Cuzco:
On ne le tire point des veines du Potose.
Qui vit content de rien possède toute chose:
Mais, sans cesse ignorants de nos propres besoins.
Nous demandons au ciel ce qu'il nous faut le moins.

—*Boileau,* 1636–1711.

2. What is the metre of this poem?
3. Explain the use of the article with ***erreur, vertu*** (line 1), ***or*** (line 13), ***bonheur*** (line 14).
4. Derivation of ***prévenir*** (line 5), ***naufrage*** (line 6), ***mûrit*** (line 15).

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* Skiff and oars.

2. GERMAN.

I. FIRST YEAR—THIRD TERM.—PROFESSORS HEWITT AND MACKOON.

I.

1. How has *zu* in German, *to* in English, come to be used with the infinitive form of the verb?
2. What relations in a sentence may this form of the infinitive sustain?
3. When is the infinitive without *zu* used?
4. What is the office of the participle in the tenses called compound, and throughout the passive voice?
5. How does the subjunctive differ from the indicative in meaning and in form? Three of its main uses.
6. How have prepositions been chiefly derived?
7. How were expressed, in the earlier forms of German and English, the relations which are now indicated by prepositions?
8. How are conjunctions classified? Mention all the general connectives.
9. What means are employed in the derivation of verbs, nouns and adjectives? What is the primitive form of these parts of speech?
10. Expand the three letters *t, k, p*, into the nine Indo-European mutes; state the law of their progression, and show by a table how according to this law they would be represented in German and English. Show by a separate table the actual correspondence between English and German.

Translate into English, (Whitney's "Reader," p. 158) from "So findet die Erwartung sich jeden Tag genährt," to "Sondern in einem Saale unter Bekannten zu sein."

II.

1. What is the syntactical relation of *Tag* (1), *Strasse* (12), *Galerie* (13)?
2. Point out in the first two periods five different classes of pronouns.
3. Why is *auf* separated from *packen* (7), and why does it adhere to *hört* (12)?
4. Where is *sei erlaubt* (3) made? why subjunctive? Why is *sei* not transposed? Explain *werden behängt* (8, 9) and *behängt sind* (14).
5. Why do *tritt* and *glaubt* (19) stand at the end and beginning of their respective clauses?
6. What kind of subordinate clauses are introduced by *bis* (2), *die* (11), *dass* (17)? Show their relation to the words on which they depend.
7. Why does *selten* (17) not immediately precede its verb, *erinnert*, as well as *nun* (11) its verb, *aufhört?* Why is *sondern* (19) used, rather than *aber?*

8. Explain the use and meaning of the suffixes: *ung* in *Erwartung* (1); *lich* in *endlich* (2), *icht* in *thöricht* (3), *haft* in *ernsthafte* (4), *er* in *Römer* (4), *gekläppert* (7), *wohnbarer* (18), *fältig* in *sorgfältig* (5), *ig-keit* in *Bedächtigkeit* (6), *bar* in *wohnbarer* (18).

9. Give the derivation of *legt* (4), *hütet* (5), *nach* (9), *erinnert* (17), *immer* (18), *nicht* (19).

10. What are the English cognates of *Glocke* (2), *Zeichen* (3), *erlaubt* (3), *Augenblick* (4), *gleicht* (12), *Zimmer* (16), *Dach* (17), *tritt* (19), *glaubt* (19), *sondern* (19).

III.

Translate into German:

When two French grenadiers, who had been prisoners in Russia, heard that France had lost, and that the emperor was a prisoner, they wept together over this sad news. Then said [the] one *of them*, who was wounded: "My old wound burns again and pains me sorely; I shall not live much longer." "Thou canst die," replied the other, "for thou hast neither wife nor child at home, who would have to go begging, but for thee." "Wife or child concerns me not," said the first again, "when my emperor is taken. If thou comest to France, grant me this last request: have me buried in French earth, with my musket in my hand, and the cross of honor on my breast, that I may lie there and listen till the emperor shall ride over my grave; then I will come forth armed, to protect him."

IV.

[*The Honor Section may perform the following in addition to the foregoing*].

Translate into English, (Whitney's "Reader," p. 26) from "Der Ritter fuhr in seiner Erzählung fort," to "meines Rosses Lauf ungestüm kreuzend und hemmend."

1. Derivation of *Ritter* (1), *Erzählung* (1), *Erhitzung* (3), *kein* (8.)

2. Etymology of *Pferde* (2), *Angst* (3), *grund* in *Abgrund* (5), *kreuzend* (11), *erst* (8).

3. English cognates of the root in *Erzählung* (1), *scheuen* (2), *triefte* (3), *Angst* (3), *werfe* (5).

4. Parse *wäre angerannt* (1, 2, 3), *werfe* (5), and give the reason for the subjunctives.

5. Define the terms "inversion" and "transposition," and give the rules for the employment of each.

II. SCHILLER'S WILHELM TELL.—PROFESSOR FISKE.

[*Examination for two Terms.*]

I.

1. *Translate,* (Act I, sc. 2) from "Er ist dir neidisch, weil du glücklich wohnst," to "Der kluge Mann baut vor."

2. Give *a.* the plurals of *Mann; b.* the various meanings of *Erb; c.* the difference in the construction of the clauses introduced by *weil* (line 1) and *denn* (line 3); *d.* the reason for the form *keins* and the etymology of the word; *e.* the etymology of *Kaiser* and the importance of it in philology; *f.* the various meanings of the stem *Reich* (or *reich*) and the cognates in English; *g.* the cognates of *trägst; h.* the omission in line 5 and the rule for it; *i.* the plurals of *Land* and their various significations; *j.* the inflection of *Herrn; k.* the various changes of the stem in *höchsten; l.* the reason for *-heit* in *Christenheit; m.* the composition of *jüngrer; n.* the derivation and grammatical character, as here used, of *sein* (fourth word in line 9); *o.* the etymology of *Glück*, of *giftger*, of *Missgunst; p.* the abstract noun derived from the stem of *längst* and the rule for such derivation; *q.* the English cognates of *geschworen; r.* the English vocables cognate with *baut; s.* the principal parts of *darfst* (4), *zeigen* (4), *erkennst* (6), *sieht an* (10–11), *geschworen* (12), *erwarten* (13).

3. Who is meant by "*den höchsten in der Christenheit,*" and why was he so styled?

II.

1. *Translate,* (Act II, sc. 1) from "Ja, ich verberg es nicht," to "Auf deinem eignen Erb und freien Boden."

2. Give *a.* the English cognate of *berg* in *verbergen* and other words in which *g* is similarly represented in English; *b.* the derivation of *Fremdlinge; c.* the cognate of *schelten; d.* the reason why the Eng. pers. pron. *I* consists of a long or dipthongal vowel while *i* in *ich* is short; *e.* the cognate of *edle; f.* the derivation of *Jugend* and the concrete noun in German corresponding to it; *g.* the origin of *-s* in *rings; h.* the etymology of *Ehre; i.* other words derived from the same stem as *sammeln; j.* the etymology of the noun *Habsburg* and the historical importance of the place; *k.* the difference in signification between Germ. *still* and Eng. *still; l.* the derivation of *geschehen; m.* the etymology of *Welt; n.* the use of *Ge-* in such words as *Getön* (12) and *Geläut* (16); *o.* the significations and plurals of *der Heerd* and *die Heerde; p.* the force of *ver* in *verführt* (17) and *verachte* (18); *q.* the reason for the form *Geburts* in *Geburtsland; r.* the rule by which "*schäme dich!*" is translated "be ashamed!"; *s.* the rule for the omission of the inflectional ending in *uralt; t.* the cognates of *kaufe* in *verkaufe; u.* the 2d pl. imper. of *nimm* and its Eng. cognates; *v.* the cognate of *werd*, of *Knecht* in *Fürstenknecht; w.* the principal parts of *schelten* (3), *liegen* (6) and its causal, *verlieren* (8), *geschehen* (9), *ladet* (13—old and new), *dringt* (14) and its causal, and *verführt* (17).

3. Who are meant by the *Fremdlinge* (2)?

III.

1. *Translate,* (Act. III, sc. 3) from "Lasst es genug sein, Herr!" to "Dem's Herz nicht in die Hand tritt noch ins Auge."

2. Give *a.* the composition of *unmenschlich* and the etymology of its stem; *b.* the grammatical term used in explaining the difference in form between *durch* and its Eng. cognate; *c.* the derivation of *Schuld; d.* the government of *kennen; e.* the use here of the form *lernen; f.* the government of *Stunde; g.* the prepositions and cases by which *denken* may be followed; *h.* the derivation of *öffnet; i.* the etymology and cognate of *Gasse; j.* the cognates of *Frisch; k.* the etymology of *gnädig; l.* the etymology of *Geschick* and any other noun of the same stem; *m.* the difference between *der* (13) and *den* (14); *n.* the derivation of *Spruch* and the reason why its radical vowel is *u*; *o.* the etymology of *sicher* and its cognates; *p.* the government of *Blicks* and its cognate; *q.* the principal parts of *gilt* and its cognate; *r.* the etymology of *Kunst; s.* the cognate of *auch*; *t.* the difference in form between *andrer* and its cognate; *u.* the grammatical character of *mir* in line 19.

IV.

Give *a.* the different reasons for the inversion of sentences; *b.* the etymology of the words *Freund* and *Feind; c.* the rule for the formation of the pret. subj. of strong verbs; *d.* the rule for the employment of the superlative adj. as predicate and adverb; *e.* some of the nouns derived from the verb *binden* with their genders and plurals.

V.

1. Give *a.* the dates and places of Schiller's birth and death; *b.* the time of his birth as compared with that of Goethe and of Lessing; *c.* the date of the composition of "Wilhelm Tell"; *d.* the names of Schiller's principal other dramas and the country in which the scene of each is laid.

2. Draw a rough map of the scene of "Wilhelm Tell," indicating the position of the lake, the cantons and places mentioned in the drama.

III. GERMAN LITERATURE.—PROFESSOR BOYESEN.

FIRST AND SECOND TERMS.

I.

1. Name the still existing monuments of the Gothic language.
2. State what is known concerning the Gothic translation of the Bible.
3. Name the most important works written in the Old High German language (*Althochdeutsch*).
4. Give the names of the principal actors in the Nibelungen Lied and a brief outline of the plot.
5. Give a brief æsthetic analysis of the Nibelungen Lied, and point out its characteristic excellencies and deficiencies as compared with the Epic of the Greeks.

6. Sketch rapidly the story of Gudrun.
7. Give the titles of the old German poems which deal with the Arthurian legends and the Holy Grail.

II.

1. Give the names of six of the most prominent Minnesingers who are known as authors of still existing Epics.
2. Describe the Minnesinger period in its historic and literary aspects as compared with the Meistersänger period.
3. State what you know about Walter von der Vogelweide, and give a list of the writings commonly attributed to him.
4. Give a brief account of the life of Ulrich von Liechtenstein.
5. Describe the metrical structure of the Minnesong as compared with the Minne-lay.
6. Define the literary tendencies of the fourteenth and fifteenth centuries.
7. State what you know about Hans Sachs.
8. Name the German satirists of the sixteenth century and give a list of their most important works.

IV. GERMAN LITERATURE.—THIRD TERM.

III.

[*Each student is required to answer any ten consecutive questions.*]

1. Describe briefly the literary character of the seventeenth century as represented by Opitz and his school.
2. State what you know about the institutions in Germany, corresponding to the Italian Academies of the fifteenth and sixteenth centuries. Trace their influence upon literature.
5. Mention the more prominent poets of the three Silesian schools.
4. What is the character of the writings of Lohenstein and Hofmannswaldau?
5. What were the principles involved in the controversy between Gottsched and Bodmer? Sketch rapidly the history and the result of the struggle.
6. Trace the development of the German novel (*Roman*) through the seventeenth and eighteenth centuries.
7. Give a concise account of the life and literary activity of Klopstock.
8. Give a complete list of Lessing's works, and the dates of his birth and death.
9. Sum up briefly the intellectual results of Lessing's life, define the principles for which he fought; his merits and his deficiencies as a dramatist.
10. What is understood by the Period of Enlightenment (*Aufklärung*)?
11. What are Wieland's characteristics as a man and an author?

12. State the leading traits of the Storm and Stress (*Sturm und Drang*) Period. What were its causes and what its results?
13. What were the ideas, foreshadowed or distinctly stated in Herder's writings, which have proved so fruitful to the science and literature of the present century?
14. Name those works of Goethe which are usually regarded as products of the Storm and Stress Period.
15. Give a rapid sketch of the life of Friedrich von Schlegel.
16. Give a criticism of Heinrich Heine as a lyric poet.

ICELANDIC.—PROFESSOR FISKE.

I.

Translate the following passage from the *Gunnlaugs Saga Ormstungu* (Section 11):

Nú búast menn til boðs um vetrinn. Þorkell frá Skáney bauð Illuga svarta ok sonum hans. Ok er Illugi bóndi bjóst, þá sat Gunnlaugr í stofu ok bjóst ekki. Illugi gekk til hans ok mælti:—"Hví býst þú ekki, frændi?" Gunnlaugr svarar:—"Ek ætla eigi at fara." Illugi mælti:—"Fara skaltu víst, frændi!" segir hann, "ok slá ekki slíku á þik, at þrá eptir einni konu, ok lát sem þú vitir eigi, ok mun þik aldri konur skorta." Gunnlaugr görði sem faðir hans mælti; ok kvámu þeir til boðsins, ok var þeim Illuga ok sonum hans skipat í öndvegi, en þeim Þorsteini Egilssyni ok Hrafni, mág hans, ok sveitinni brúðguma í annat öndvegi gegnt Illuga. Konur sátu á palli; ok sat Helga hin fagra næst brúðinni, ok renndi opt augum til Gunnlaugs; ok kemr þar at því sem mælt er, at *eigi leyna augu, ef ann kona manni.* Gunnlaugr var þá vel búinn, ok hafði þá klæðin þau hin góðu, er Sigtryggr konungr gaf hónum; ok þótti hann þá mikit afbragð annarra manna fyrir margs sakir, bæði afls ok vænleiks ok vaxtar. Lítil var gleði manna at boðinu.

1. *Give the principal inflectional parts of* búast, bauð, gekk, svarar, fara, skal, þrá, lát, vitir, görðu, kvámu, sátu, ann, *and* þótti.
2. *The derivation of* bóndi, frændi, ekki, eigi, aldri, mælti, öndvegi, leyna, afbragð, *and* gleði.
3. *The composition of the names* Þorkell, Gunnlaugr, *and* Illugi.
4. *Inflect through all cases of the singular and plural the phrase* Helga hin fagra.
5. *Explain the use of the pronoun in the phrase* þeim Þorsteini Egilssyni ok Hrafni.
6. *Give an account of the word* guma *in* brúðguma.
7. *What makes the vowel in* nú *long?*
8. *Give the changes caused by the* i-*umlaut and the* u-*umlaut, and illustrate them as fully as possible from the above passage.*

II.

Translate from *Hómers Odysseifsdrápa* (Book ix):—

En er sól var runnin og rökkur á komið, lögðum vér oss til svefns

á sjávarströndinni. En er hin árrisula, rósfingraða Morgungyðja kom í ljós, setti eg þing, og mælti í áheyrn allra:—" Mínir kæru félagar! þér skuluð nú vera hér eptir, en eg ætla að fara með skip mitt og lagsmenn mína, og vita, hverir menn þetta eru, hvort þeir eru ofstopamenn, villimenn og ójafnaðarmenn, eða gestrisnir menn og guðhræddir." Að því mæltu steig eg á skip, og bað förunauta mína fara upp í og slá skutfestum. þeir gengu þegar á skip og settust á þópturnar; og þegar hver var kominn í rúm sitt, lustu þeir árum hinn gráa sæ.

1. *Make a list of the words which would be differently spelt in Old Icelandic.*
2. *The principal parts of* runnin, setti, steig, bað, slá *and* lustu.
3. *The English cognates of* svefn, félagar, steig; *the German cognates of* nauta *in* förunauta *and of* og.
4. *Inflect* sjávar *in* sjávarströndinni.
5. *Explain the form* settust *and the derivation of the suffix.*
6. *Give the various possible significations of* á *as particle, verb, noun, etc.*

III.

Write out in prose the following stanza, and translate:—

Mana gramr við mik
(Venr hann gjöfli sik
þess man grepp vara)
Gullhring spara.
Segi hildingr mér,
Ef hann heyrði ger
Dýrligra brag;
þat er drápulag.

1. Give the name of this measure and explain its construction.
2. Explain fully the suffix *a* in *mana*.

IV.

Point out the *hendingar* and alliterative letters in the following:—

Lagðak orms at armi
Arms góða mér tróðu
(Guð brá Lofnar lífi
Lins) andaða mína.
þung var þorna spangar
þraut, en humra brautar
þó er beiðanda biða
Bliks þungara miklu.

1. What is the name given to the above measure?
2. What name is given to the verse in the stanza beginning

Roðit er sverð, en sverðan
Sverðrögnir mik gerði—

V.

1. *Write a brief résumé of the* Gunnlaugs Saga.
2. *Give the principal dates and incidents in the life of* Ari þorgilsson; *of* Snorri Sturluson; *of* Sturla þórðarson.

IV. ANGLO-SAXON AND ENGLISH LITERATURE.—PROFESSOR CORSON.

I. ANGLO-SAXON.

Give synopses of case-endings of the three declensions of nouns and of the definite and the indefinite declensions of adjectives. Give the plurals fisc, dæg, cræft, beáh, wíf, sceáp, heafod, bebód, fæt, spere, and the rules they follow. Decline bóc, bróðor, burh, cú, lús, mann, modor, turf, sunu. Decline, definitely and indefinitely, smæl, glæd, fæst, fæger, éce, grim, hálig, heáh, hræð. Compare strang, eald, geong, sceort, sófte, heáh, yfel, mycel, lytel. Decline, as possessive adjective pronouns, the genitives singular, dual, and plural, of the personal pronouns ic and þú. Give synopsis of the inflections of strong verbs. Give the parts of the verb that have the same root-vowel. Give the changes the root-vowel of the 1st pers. pres. indic. undergoes in the 2d and 3d pers. when the vowel of the endings -est and -eð is syncopated, and give the euphonic consonantal changes and omissions which then take place. Conjugate beorgan, yrnan, ceósan wesan, beón, dón, willan, habban, ágan, cunnan, witan. Give synopsis of the inflections of weak verbs. State peculiarities of the different classes of weak verbs and the euphonic consonantal changes and omissions which their conjugations present. Explain and give several examples of the use of the dative infinitive.

Read and Translate:

He sæde ðæt Norð-manna land wære swýþe lang and swíðe smæl. Eal þæt his man áþer oððe ettan oððe erian mæg, þæt lið wið ðá sæ; and þæt is þeáh, on sumum stówum, swýðe clúdig; and licgað wilde móras wið eástan, and wið upp on emnlange þæm bynum lande. On þæm mórum eardiað Finnas; and þæt byne land is eásteweard brádost, and symle swá norðor swá smælre. Eástewerd hit mæg bión syxtig míla brád, oþþe hwéne brædre; and middeweard þritig oððe brádre; and norðeweard, he cwæð, þær hit smalost wære, þær hit mihte beón þreora míla brád tó þæm móre; and se mór syðþan, on sumum stówum, swá brád swá man mæg on twám wucum oferféran; and, on sumum stówum, swá brád swá man mæg on syx dagum oferféran.

Explain construction of "his," in "Eal þæt his man." Explain "áþer oððe . . oððe; wið upp on emnlange; symle swá norðor swá smælre." What modern English phraseology is derived from A. S. construction like "syxtig míla brád?" Explain "hwéne."

2. CHAUCER.

1. Give the usual noun-declensions of Chaucer's English.

2. How is the definite form of adjectives distinguished from the indefinite? Give examples of the two forms. What definite adjectives are generally used without the distinctive endings? Examples. What is the usual plural form of adjectives? What adjectives usually drop the distinctive plural ending?

3. Give the usual inflections of weak verbs in the indicative mood, pres. and past tenses. What verbs end in *-t* in the third person sing.? Examples of each.

4. How do strong verbs form their past tense and their past participles? Past plural? Examples of each.

5. Give the inflections of the subjunctive mood, pres. and past tenses, sing. and pl.

6. Inflections of the imperative mood, sing. and pl.? Give examples. Infinitive endings? Examples. Which of the infinitive endings is most used? What generally determined the use of the other endings?

7. What two participial endings were in use in the English of the XIVth century? Which was generally used by Chaucer, and which by Gower?

8. How are adverbs formed from adjectives? from nouns? What is the usage of the language in regard to the employment of negatives, especially when emphatic? Give examples of the negative united with the verb.

9. In what respect did the accentuation of the English of the XIVth century differ from that of the present English?

10. State the various endings and inflections of the Anglo-Saxon of which the final *-e* of Chaucer's words is a residual or a representative.

11. What are the general rules in regard to the syllabic value of the final *-e* in Chaucer's verse?

12. Scan the following verses, and explain where the final *-e* is sounded, and where it is mute:

V. 38. To telle yow alle the condicioun.
53. Aboven alle naciouns in Pruce.
90. All ful of fresshe floures, white and reede.
102. At that tyme, for him lust ryde soo.
132. In curtesie was sett al hire leste.
148. But sore wepte sche if oon of hem were deed.
183. And I seide his opinioun was good.
221. Full sweetly herde he confessioun.
235. And certayn he hadde a mery noote,
249. And overal, their eny profyt schulde arise.
311. A Sergeant of Lawe, war and wys.
341. An househaldere, and that a gret, was he.
385. He cowde roste, sethe, broille, and frie,
Make mortreux, and wel bake a pye.

417. He kepte his pacient wondurly wel.
535. And thanne his neighebour right as himselve.
557. His nose-thurles blake were and wyde.
A swerd and a bocler baar he by his side.
567. A gentil Maunciple was ther of a temple.
767. For trewely comfort ne merthe is noon.
823. Ye woot youre forward, and I it you recorde.

III. ENGLISH LITERATURE.

NO. I.

[*Each student will receive four or five connected questions, the answers to which are to be embodied in an Essay written during examination hours. The literary merits of the Essay, as well as the correctness and fullness of the answers given, will be taken into account.*]

1. Name the chief literary productions of the 14th century that claim the student's special attention.

2. What is the character of the Vision of William concerning Piers the Plowman? In what does its great historic value consist?

3. What dogma of the church was the special object of Wyckliffe's condemnation?

4. What are the literary merits of the Wyckliffite versions of the Scriptures?

5. What previous attempts at vernacular translation had been made in England?

6. What influence was exerted by the Wickliffite versions, upon subsequent versions?

7. What noteworthy circumstance in the history of the literatures of Protestant countries, is connected with the translation of the Scriptures into the vernacular?

8. What qualifications did Chaucer possess for becoming a great national poet?

9. What were the chief obstacles to his continued popularity, after the close of the 14th century?

10. What dramatic advantages has the plan of the Canterbury Tales over that of the Decameron of Boccaccio?

11. How is the literary dearth of the 150 years succeeding the death of Chaucer, to be partially accounted for, and upon what was the best productive mind of the nation during that time chiefly expended?

12. Who were the principal poetic representatives of this period? State what you know about them and their works.

13. What are the claims of the Earl of Surrey to his rank in English literature?

14. What is the character of "The Mirrour for Magistrates"? By whom was it planned and what did he contribute to it?

15. In what grand respect did Spenser differ from his cotemporaries and his immediate successors, especially Shakespeare?

16. Define the terms Classical and Romantic as applied to the two schools of literary art which, in Spenser's time, in England and on the continent, were struggling for the ascendency.

17. How may the Faerie Queene be characterized in respect to its relation to the two schools of literary art, the Classical and the Romantic?

18. What influence has been exerted by Spenser on English poetry, and in which of the modern poets is his influence most apparent?

19. State the chief distinguishing characteristics of Shakespeare's dramatic art.

20. In what does his great superiority to Jonson in the delineation of character, chiefly consist?

21. Upon what principle does Shakespeare seem to have proceeded in always working upon the basis of a previously existing story or play? And in thus working, how does his genius especially show itself?

NO. 2.

1. Give the four distinct periods into which Milton's authorship may be divided.

2. What were Milton's views as to the qualifications of a great poet?

3. State Macaulay's theory as to the requisites of success in the exercise of poetic genius.

4. What do you understand by a poetic reflection of an age? And why are great poets the truest historians?

5. What is it that makes Milton the great central figure of his age?

6. Compare Dryden with Milton as a reflector of his age.

7. Give an account of "the Collier Controversy."

NO. 3.

1. What was the occasion of Pope's Rape of the Lock? What were Pope's models in its composition?

2. State the relations of the poem to Pope's time.

3. In what form of poetry did the spirit of his age find its best embodiment?

4. Give an account of the Ossian controversy.

5. What good influence was exerted upon English poetry by Bishop Percy's Reliques?

6. State as fully as you can what you consider Cowper's relations to have been to the great revival in English poetry.

7. Trace succinctly the progress of the revival and the opposition it met with up to its culmination in Wordsworth.

4. CRITICAL READING.

MILTON'S LYCIDAS.

Give the occasion of the composition of the poem, and analyze

its structure. Explain as minutely as possible the ecclesiastical allegory running through it. In what different senses have the five opening lines been understood? v. 1, force of "yet?" v. 3, "crude," original meaning? What other English word has the same root? v. 6, "sad occasion dear;" give several other examples from Milton of this arrangement of epithets. Explain "dear." Give examples from Shakespeare of this use of the word; Craik's explanation? Horne Tooke's etymology? v. 7, "Compels," why used in the singular? "to disturb your season due?" Explain. v. 8, "Lycidas;" where did Milton get this name for his shepherd, and why did he probably choose it? Etymological meaning of the name? v. 11, "rhyme;" correct etymology of the word? Why was the "h" introduced in the spelling? v. 13, "welter;" etymology of word? What other English verbs have the same root? "to," force of? Give other examples from the poem, of this use of the word. In what present English phrases is it still so used? v. 14, "melodious tear," explain. v. 20, "lucky words;" explain the epithet. v. 22, "sable shrowd," explain; etymology of "shrowd?" v. 23, *et seq.*, explain biographical allusion. v. 33, "oaten;" what form have adjectives in -en given place to in present English? What change in meaning have those that are retained, undergone? v. 38, "must," force of? v. 47, "wardrop," what is the usual order of the elements of a compound word? How is the order in "wardrobe" accounted for? v. 49, "such," force of? v. 55, "wisard," propriety of the epithet? original force of -ard? usual present force? Give other examples. In what word has it been corrupted? v. 59, "inchanting," explain the epithet. v. 61, "the," force of? v. 64, "boots," etymology of word? "uncessant." What is the present rule in regard to the use of un- and in-? v. 64–69, explain the allusion. v. 67, "use," modern use? v. 75, "Fury," how does the poet use the word here? v. 76, "life," what figure? v. 79, "in the glistering foil," construe. v. 81, "by," force of? v. 82. "perfet," explain the form. v. 85, "honour'd," explain the epithet. vv. 87, 88, explain. v. 90, "in Neptune's plea," explain. v. 93, "every," etymologically = what? difference between the uses of "each" and "every?" v. 97, "was stray'd," what distinction was formerly observed in the use of *be* and *have* as auxiliaries? Difference between "is come" and "has come?" v. 101, "th' eclipse," force of "the?" "with," force of? v. 103, "went," what would be used in present English? Derivation and original sense of "went?" v. 104, what is the allusion? v. 106, "Like," construe. v. 110, "twain," three uses of, in Elizabethan English? v. 111, "amain," etymology, and force of the word here? v. 112 "bespake," give other examples from Milton of this use of the word; what force has be- in present English? v. 114, "Anow," difference, originally, between the use of "enow" and "enough?" v. 119, "Blind mouthes!" Is Hale's explanation acceptable? What other explanation would make the expression more poetic? v. 120, "the least," construe. v. 121,

"faithfull," what has probably caused the dropping of one l in present spelling? v. 123, "list," its derivation and earlier use? In what word does it survive? And to what other word is it akin? v. 126, "draw," in what form is the word still used in this sense? v. 129, "and nothing sed," explain construction of this phrase. vv. 130, 131, to what are these two lines generally understood to allude? but what is their more probable meaning? vv. 132, 133, "Return, Alpheus, ... return, Sicilian Muse," explain. v. 134, "bid them hither cast," what is involved in "hither?" v. 138, "swart star," force of epithet? v. 140 "quaint," etymology, and force of here? v. 142, "rathe," what form of this word is still in use? What other form is found in Shakespeare and earlier writers? Where has Tennyson used "rathe?" v. 149, "his:" give history of the present neuter genitive "its." v. 151, "laureat herse," explain "herse," and give examples of its earlier use; explain the epithet. v. 152, "so," force of? v. 158, "monstrous" =what? v. 159, "moist vows," develop; v. 160, "fable of Bellerus old," what rhetorical figure? vv. 161–163, explain the ecclesiastical meaning of these lines; "ruth," in what modern English word does it survive? in what verb? explain the form. v. 166, "your sorrow," what rhetorical figure? Give examples of other abstract nouns used in a concrete sense; examples from the Latin and Greek; v. 173, "that walk'd the waves," after what class of intransitive verbs was it common in Elizabethan English to omit the preposition? Give examples from Shakespeare. What difference in meaning is there in "walk'd the waves" and "walk'd on" or "walk'd o'er the waves?" Which is the more poetic, and why? v. 176, "unexpressive," explain the use of adjectives in -ive and -ible, in Elizabethan English, and give examples, from Shakespeare, of such adjectives used in a passive and in an active sense; v. 184, "thy," personal, or possessive adjective pronoun? "good," force of? Any like use in modern English? v. 185, "that wander in that perilous flood," what force has "in" here, different from what "on" or "o'er" would have? v. 186, "uncouth," radical and derivative meanings? meaning here? v. 189, "thought," force of? "Dorick," explain the epithet; v. 190, "stretch'd out all the hills," explain; what equivalent expression in Virgil's Eclogues? v. 192, "twitch'd," explain; "blew," why this epithet? v. 193, explain this verse.

V. MATHEMATICS.

[*The subjects in this department are distributed among the several Professors differently during successive years.*]

I. ALGEBRA—PROFESSORS BYERLY AND WAIT.

1. Find all the commensurable roots and one incommensurable root of the equation $x^5 - 4x^4 + 13x^3 - 47x^2 + 80x - 44 = 0$.

2. Find a formula for the sum of n terms of an arithmetical progression by making it depend on the $(n+1)$st term of a new series, and show that your formula is identical with the one found by the usual process.

3. Find the logarithm of 8608; interpolating in your table by the aid of the formula for the $(n+1)$st term of a series.

4. Develop $\sqrt{1+x}$ into a series by the binomial theorem, and also by the method of undetermined coefficients.

5. Compute the logarithm of .002, to the fourth approximation by the method of continued fractions.

6. Calculate by logarithms the value of the expression

$$\sqrt[10]{\left[\frac{(4.275)^3 + \sqrt[4]{26.41} \times 0.0832}{0.09628 \times \sqrt{\frac{623}{1785}}}\right]^7}$$

2. TRIGONOMETRY—PROFESSORS ARNOLD AND WAIT.

1. Define the six principal trigonometric functions of ϑ, as *ratios*; and extend the definitions to the case of angles $<0°$ and $>90°$. Find eight fundamental relations among them, *for all values of* ϑ. Obtain $\sin\vartheta$ in terms of $\tan\vartheta$.

Show what lines, drawn to a circle whose radius $=1$, have the same values as the trigonometric functions or ratios. In what sense can a line and a ratio be said to have the same value?

Write out the six functions of $-\vartheta$, $\frac{1}{2}\pi \mp \vartheta$, $\pi \mp \vartheta$, $\frac{3}{2}\pi \mp \vartheta$, $2\pi \mp \vartheta$, $-5\pi \mp \vartheta$, in terms of those functions of ϑ which express them most simply. What relation has this problem to the mode of using trigonometric tables?

Give the six functions, also versin, coversin and suversin, of the following angles: 0°, 60°, 120°, 225°.

2. Write formulæ for $\sin(\alpha \pm \beta)$ and $\cos(\alpha \pm \beta)$. How do you know that these formulæ are true even when α and β are not between 0° and 90°? Illustrate by the case of $\sin(\alpha+\beta)$.

Proceeding from these, find formulæ for $\tan\frac{1}{2}\vartheta$ and for

$$\frac{\sin\gamma + \sin\delta}{\sin\gamma - \sin\delta}.$$

3. In quadrilateral $ABCD$, let $AB=80$, $BC=70$, $CD=60$, $DA=50$, $AC=40$; and find BD. Use four-place logarithms; and estimate, roughly, the degree of accuracy in your result.

4. State Napier's rules for spherical right triangles; and demonstrate, using Evans's method.

5. Find, in nautical miles, the length of the shortest path from a point off Cape Horn, in 57° S. lat. and 67° W. long., to a point in 43° 15′ S., 147° 30′ E. off Hobarton. In sailing upon this track, how must I steer at first?

3. PLANE ANALYTIC GEOMETRY.

1. The centre of gravity of two heavy points is known to divide

internally the line that joins them, in the inverse ratio of their weights. Let the points P_1, P_2, P_3 have the weights m_1, m_2, m_3; and let the point P_{23}, at the centre of gravity of P_2 and P_3, have the weight $m_2 + m_3$, and similarly with P_{31} and P_{12}. Prove that P_1 and P_{23} have the same centre of gravity as P_2 and P_{31}, or as P_3 and P_{12}.

What properties of plane triangles can you deduce from this; and what theorems concerning centres of gravity for many bodies?

2. Rectangular equations of two lines; the first containing point $(-2, 3)$ and making the angle $-45°$ with axis OX; the second, containing points $(2, 3)$ and $(-4, -6)$.

Distance of each line from the origin; intercepts on the axes; distance of the lines' intersection from point $(1, 1)$; tangent of their angle of inclination.

Transform the lines' equations to oblique coordinates whose axes make angles $+30°$ and $+60°$ with OX, and whose origin is $(1, 1)$; also to polar coordinates whose origin and axis are O and OX.

3. Rectangular and polar equations of the circle that contains points $(0, 0)$, $(1, 7,)$ $(7, -1)$. Show when its radius vector becomes negative, and interpret this result.

4. Prove that the tangent at any point of an ellipse or hyperbola is equally inclined to the two lines from that point to the foci. What is the corresponding theorem for the parabola, and why?

5. Prove that every equation of the second degree represents an ellipse, a parabola, a hyperbola or right lines.

6. Through a fixed point O passes a moving line that cuts a given hyperbola in points P', P''. Find locus of that point P on the line, which divides $P'P''$ harmonically with respect to O.

4. SOLID ANALYTIC GEOMETRY—PROFESSORS BYERLY AND WAIT.

1. Find, by projections, the cosine of the angle between two lines, in terms of the lines' direction-cosines.

2. Write the equation of the plane, in four of the most important and dissimilar forms; interpret each, and show whether it extends to oblique coordinates, and how obtained.

3. Find the shortest distance between two non-intersecting diagonals of adjacent faces of a given cube.

4. Locus of equations $U = V = W = 0$; of $U = VW = 0$; of $U + k. V = 0$; of $UV + mUW + nVW = 0$; where $U = 0$; $V = 0$, $W = 0$ represent any surfaces.

5. Classify the surfaces $Ax^2 + By^2 + Cz^2 + 2Lx + 2My + 2Nz = 0$, by referring to new coordinate axes so as to simplify their equations.

5. HARMONOID GEOMETRY.

(*Use symmetric methods by preference.*)

1. By theory of permutations, how many essentially different

harmonoid ratios are determined by four given elements? Show that each of these ratios fixes all the others unambiguously; and utilize this in defining homography.

Show that either harmonoid of a pencil, if defined by the aid of the sines of the angles, is independent of the choice of positive direction on either ray; and that the above discussion applies to such harmonoids.

Prove that a pencil of $2n$ rays cuts any transversal homographically. Resulting theorem for two pencils or ranges, and its converse. Cases where one intersection is at infinity, and where two corresponding elements are identical. Methods of completing a pencil or range homographically to another.

2. Distinguish descriptive from metric relations. What classes of either are projective, and why?

Prove that any four tangents to a conic meet any fifth tangent in a range homographic to the pencil of rays that join the four points of contact to any fifth point on the curve.

3. Obtain and reciprocate Pascal's theorem.

Given five points on a conic, draw a tangent at either; also find where the conic meets a given line through either point. Reciprocate these problems.

Through a given point, draw a line to the unseen intersection of two given lines.

4. Establish the fundamental theorems of involution by Evans's method, from the properties of the completed quadrilateral.

6. CALCULUS—PROFESSOR OLIVER.

ONE-TERM COURSE.

1. Define Curvative, Osculating Circle, Radius of Curvature, Centre of Curvature, Evolute. What are the two most important properties of the evolute of any curve?

2. Find the length of the radius of curvature of the curve $x^2 = 4y$ at the point whose abscissa is 2.

3. Find at what point of the curve $x^2 = 4y$ the radius of curvature will be a minimum.

4. Give the reasoning in full of the method of determining by integration the centre of gravity of a parabolic segment.

Example.—Find the coordinates of the centre of gravity of the segment of the parabola $y^2 = 2mx$ cut off by the double ordinate through (x_1, y_1).

7. CALCULUS—PROFESSORS OLIVER AND BYERLY.

FULL COURSE, EXTENDING THROUGH THREE TERMS.

1. Explain the terms "limit," infinitesimal," "order of infinity," "derivative," "differential" or "virtual increment," "difference" or "increment."

Compare the method of limits, that of infinitesimals, and Lagrange's; and show that all three are rigorous.

Show that integration, defined as a certain limiting case of summation, is the inverse of differentiation. Explain its relation to the arbitrary or undetermined constant, and the theory of definite integrals.

Likewise illustrate all the above topics by aid of a curve, or of a moving point.

2. Show that $\lim\,(1+i)^{\frac{x}{i}}$ can, by assigning a suitable law to the infinitesimal i, be developed by the binomial theorem for positive integer exponents; and that it converges.

Obtain the derivative of ϵ^x; of $\log x$.

3. Differentiate $\sin^{-1}\dfrac{a+b\sin 3\sqrt{x}}{b+a\sin 3\sqrt{x}}$.

4. Express $D_x{}^2y$ in terms of derivatives of x with respect to y.

5. Write Taylor's Theorem in two forms. Develop $\sin x$ and $\cos x$. Obtain De Moivre's formulæ, and describe the six hyperbolic functions.

6. Investigate the conditions for a maximum or minimum in a function of two variables. Apply to the function $xy(1-2x-3y)$.

7. Prove that at any point of a surface the sum of the curvatures of mutually perpendicular normal sections is constant.

8. Integrate $\dfrac{dx}{a^2-x^2}$ into both logarithmic and hyperbolic forms.

Obtain the integral $\int\dfrac{dx}{x}=\log x+C$ from the general form of $\int x^m dx$.

9. Integrate $\dfrac{2+3x}{(x^2-x+1)^2}\,dx$.

10. Show how to integrate every rational function of x and $\sqrt{(ax^2+bx+c)}$, by introducing an auxiliary angle.

11. Show when $x^m(a+bx^n)^p dx$ is integrable. Explain the methods of reduction by which either m or p can be increased or diminished.

12. Integrate $(ax+by+c)dx+(a_1x+b_1y+c_1)dy=0$.

13. Obtain the singular solution of equation $a^2(dy^2+dx^2)=(ydx-x\,dy)^2$; and explain the relation of singular solutions to envelopes.

14. Find the orthogonal trajectories of the system of circles with a common chord, $y^2+x^2x-2a=b^2$; where a varies.

8. DESCRIPTIVE GEOMETRY.

[*Students, in all the courses, are admitted to the class in Descriptive Geometry as optional students. But the study is required in the course in* ARCHITECTURE, CIVIL ENGINEERING,

and in MECHANIC ARTS. *The subject is taught under the supervision of the Professor in Civil Engineering.*]

I. FIRST TERM.

2. Find the angle an oblique plane makes with the ground line.
3. Through a line draw a plane perpendicular to a given plane.
6. Draw a plane tangent to a cone and parallel to a given line, the axis of the cone being in the ground line.

II. SECOND TERM.

1. Find the projections of a cone, having a circular right section, when taken oblique to the planes of projection; and the development of the surface between the vertex and the horizontal plane.
2. Find the intersection of a plane with a cylinder having its axis in the ground line.
6. Given one element of the first, and three of the second generation, of a hyperbolic paraboloid—the element of the first generation passing through the vertex of the surface—and a plane, containing the element of the first generation; to find the point where the plane is tangent to the surface.
7. A village lot is divided into squares, and the references of the corners determined; find the cut or fill at each corner, and the number of cubic yards of earth to be removed to reduce the surface to a given uniform grade.
9. Through a line pass a plane perpendicular to a given plane and find its scale of declivity.
10. Draw a normal line to the skew arch soffit at a given point of the surface.

VI. NATURAL HISTORY.

I. PHYSIOLOGY—PROFESSOR WILDER.

1. State the chemical resemblances and differences between butter and sugar.
2. State the general object of digestion.
3. State the functions of the pancreatic juice.
4. Define tidal air and state its average amount.
5. Make a diagram of gray and white nervous tissue: state where they occur and their properties.
6. State the difference between plasma and serum.
7. Give a diagram of both sides of the heart; indicate the source, nature and destination of the blood currents.
8. Give a diagram of the hepatic circulation; indicate the source, nature and distribution of the blood, and the changes produced by the liver.
9. State the difference between coma and syncope, and indicate their treatment.

10. Name three common clothing stuffs in the order of their protection against cold.
11. Give a diagram of a vertical section of the skin.
12. State the effect of irritating the anterior root of a spinal nerve *inside* of a section through it.
13. Name the essential ganglia of the brain in their order from behind forward.
14. Give a diagram of the tympanum and its contents.
15. State the structure, position and properties of the "blind" and the "yellow" spots upon the retina.

2. PHYSIOLOGICAL BOTANY—PROFESSOR PRENTISS.

1. What are the essential characters of a typical flower?
2. Explain the theoretical structure of the pistil.
3. Distinguish between free and distinct, cohesion and adhesion, pinnate and pinnatifid.
4. Explain the structure of a flower of Compositæ.
5. In what plant is the greatest amount of pollen secreted? Why?
6. What is assimilation? Where and under what conditions does it take place?
7. Show that a flower is homologous with a branch.
8. State some of the distinguishing characteristics between Trillium grandiflorum and T. erectum.
9. Mention ten trees indigenous to New York, and state the Natural Order to which each belongs.
10. What change in structure would convert a raceme into a corymb?
11. State the leading botanical characters of each of the following orders: Rosaceæ, Leguminosæ, Crucifera, Ranunculaceæ.
12. Define Genus, Species, Order. State the origin of generic, specific, and ordinal names.
13. Draw diagrams to show: 1. Ovary free. 2. Ovary adherent. 3. Excurrent stem. 4. Versatile anther. 5. Introse anther. 6. Imbricate æstivation. 7. Valvate do. 8. A petiolate, ovate, cordate, serrate leaf with stipules.
14. Characterize the different kinds of plant tissue.
15. Name six natural orders largely represented in the flora of Ithaca.
16. What are four of the most important orders in temperate regions in regard to their useful products?
17. Explain some structural provisions in plants which aid in their dissemination.
18. What substances constitute the principal food of plants?
19. Describe the different shapes of monopetalous corollas.
20. Explain the terms diœcious and monœcious.
21. Give examples of common diœcious plants.
22. How do ordinary tendrils act?

23. Of what advantage is it to a plant to climb?
24. Explain the general structure of a leaf.

3. ZOOLOGY—PROFESSOR WILDER AND MR. COMSTOCK.

1. What kinds of groups are usually admitted among animals?
2. Characterize the Vertebrates.
3. Characterize *Amphioxus*.
4. Give a longitudinal section of *Amphioxus*.
5. Give a longitudinal median section of the branchial region of *Petromyzon* (the lamprey).
6. Characterize the larval form of *Petromyzon*.
7. Give the geographical distribution of the existing Ganoids, including the Dipnoans.
8. Give in three vertical columns the constant and peculiar characters of the Ganoids, Selachians, and Teleosts.
9. Describe and figure the development of a frog.
10. Describe peculiar forms of gestation among Batrachians.
11. Give a diagram of a frog's brain from above.
12. State the resemblances and differences between Reptiles and Birds.
13. Name fossil forms which seem to connect the two classes.
14. Characterize the Mammals.
15. Give a diagram of an embryo opossum.
16. Name and give an account of the simplest organism known.
17. Describe the development of a free-swimming medusi-form reproductive bud.
18. Give an account of the coral-making *Zoantharia*, noticing especially the following points:—Relation of coral to body of polyp, modes of reproduction, forms of coral communities as resulting from different modes of increase or growth, and the distribution in latitude, and in depth, of the reef-building species.
19. Give an account of the Pork Tape-worm of man, (*Taenia solium*).
20. Characterize the Spiders, (*Araneida*).
21. Give tabular arrangement of the typical mouth-parts of an insect.
22. Explain the terms, larva, pupa, chrysalis, complete metamorphosis and incomplete metamorphosis.
23. Describe a fresh-water Polyzoon.
24. Discuss the zoological position of the *Brachiopoda*.
25. Describe shell of an *Orthoceras*.

GENERAL GEOLOGY—PROFESSOR COMSTOCK.

1. Give concise review of oceanic and atmospheric currents, as influenced by configuration of land.
2. Modes of origin of rocks, with varieties of texture.
3. Explain "cycles of deposition."

4. Give proofs of slow movements in the earth's crust.
5. Outline the prominent theories of mountain elevation.
6. Nature and effects of Metamorphism.
7. Name the geological period in which each of the principal North American mountain chains was elevated.
8. Causes and effects of hot springs and geysers.
9. Brief resumé of effects produced by organic agencies.
10. Name, in the order of relative importance, the classes of animals and plants represented in each geological age.
11. Review briefly the history of the Azoic and Eozoic ages.
12. Brief account of the life of the Trenton Period.
13. Review the life of the Devonian Age.
14. Review the life of the Mesozoic Era.
15. Give the evidence in support of the glacial theory.
16. Classify the epochs of the Pre-Historic Era, showing stratigraphic equivalents, and giving characteristic relics of each epoch,
17. Describe the remains of *pfhlbaaten* and *kjökken-mödding*, giving geographical distribution of both.
18. Give an outline of North American Archæology.
19. Say all you can about the *Champlain Period* in America.

VII. MORAL AND INTELLECTUAL PHILOSOPHY.—PROFESSOR WILSON.

[*The examinations in this Department are conducted by means of a Syllabus of the lectures on each subject, the questions and topics of the Syllabus are divided into sets, with five or more in a set, one of which is drawn by lot by each student at the time of the examination, and the answers and discussions are written in the presence of the professor. The following are given as examples, only two or three from each Syllabus:*]

I. PSYCHOLOGY.

I.

1. What is the relation of the Body to the Mind?
21. What is Materialism in relation to Psychology?
41. What is false perception, and on what conditions may it occur?
61. What are the appetites, and how are they related to the excito-motor emotions?
81. Explain the difference between the æsthetic and the ethic emotions in reference to their origin.
101. What is the difference between volition and choice?

VI.

6. Describe and name the ganglia of the sensorium.
26. Can voluntary action be distinguished from involuntary action by the mere observer? Why not?

46. What are the reasons for regarding the optic thalami as the organ of the sense of touch?
66. How are affections influenced by the voluntary control of thought?
86. What reason is there to suppose that the emotions of self are influenced by difference of physical organization?
106. State the changes in the character of the life of an individual as he passes from infancy to old age.

XIX.

19. What influence have the excito-motor and the sensori-motor emotions upon the character and habits of life?
39. What would be our condition in relation to knowledge of external objects, if we had no sense of touch?
59. Explain the four processes by which nouns as names of things are formed.
79. What are sentiments? and how do they differ from judgments?
99. Why cannot we prove as a matter of fact that animals have volition?
119. What changes take place in the character of memory as we pass from childhood to old age?

2. MORAL PHILOSOPHY.

[*Each student writes an essay on one of the following topics drawn by lot at the time of writing it:*]
1. The nature and limit of Moral Action.
2. The influence of theories of Morals on character.
3. The Moral character of Acts as distinct from the Guilt or Innocence of the Agent.
4. Reflex-action in its relation to Freedom of Will.
5. Æsthetic Culture and its relation to Morality.
6. Benevolence as a Sentiment and as a Principle.
7. The Duty of Truthfulness and the extent of its obligations.
8. The Duty of Justice as between Man and Man.
9. The Rights of the State as against Subjects.
10. Citizenship as a Natural Right.
11. Religion as a Natural Duty.
12. In cases of conflict of Duties, what general rules may be given as our guide in determining what is our Duty?

3. LOGIC.

I.

1. Explain the nature and province of Logic. What are its relations to Psychology?
21. What is the fallacy of Undistributed Middle? When will it occur? Why can there be no Universal Conclusion after a Partial Premise?

41. Explain what is meant by "the presumption," "the probability," and "the certainty of propositions." How many kinds or degrees of certainty are there?

Analyze and explain examples 6, 22, 99.

V.

5. What is synthetic reasoning? Why do we call it *a posteriori*? What are the four relations of things on which it depends?

25. What is a *Sorites?* How may its validity be tested (1) by reduction to syllogisms, (2) by general rules?

45. What are "examples?" what "exceptions?" and their relations to each other? Explain the method and fundamental principle of induction.

Analyze and explain Examples 5, 30, 114.

X.

10. When do separable accidents become essential? When essentia and differentia? What is artificial classification, and how does it differ from natural classification?

30. What are disjunctive syllogisms, and the ways of completing them? What is Excluded Middle?

50. Explain the relation of Logic to Rhetoric, and the difference between them in reference to argumentation.

Analyze and explain Examples 14, 53, 102.

XV.

15. Explain "immediate inference" by composition (§§ 93, 94.) What is the fundamental law in regard to the force of negatives?

35. What is Ambiguous Middle? Give and analyze an example. How does this differ from Undistributed Middle?

55. What is the difference between refuting one's *reasoning* and refuting his *conclusion?* How can the former be done? What is the effect of it?

Examples 18, 39, 115.

XX.

20. What is the Fallacy of Negative Premises? Why may there be no conclusion after two Negative Premises? Why no affirmative conclusion after one Negative Premise?

40. May a syllogism be at the same time a fallacy in form and in diction? What is necessary to detect a fallacy in diction? Why?

60. Explain the difference between direct and indirect refutation. What are the three kinds of indirect refutation?

Analyze and explain Examples 24, 45, 138.

4. HISTORY AND CRITICISM OF PHILOSOPHY.

V.

5. Describe and define the six classes of nouns: (1) individual,

(2) abstract, (3) general, (4) collective, (5) privative, and (6) negative.

25. Give an account of the Sophists; of Socrates; and the origin of the word "philosophy."

45. State Comte's objection to consciousness, as a means of knowledge. What would be the consequence of accepting it?

65. What is meant by the word "*faculty,*" as applied to the mind? What influence has the philosophy of Reid had upon this use of words, and the views of the nature of the mind?

85. What is meant by calling God "the Absolute," "the Infinite," etc.? What is the law of the English language, in regard to the use of the article before adjectives? How does it differ from the Greek usage?

X.

10. What is the law with regard to the quality of nouns that may be connected by conjunctions? The reason for it?

30. To what department of Philosophy did Aristotle chiefly devote himself? What was his attitude in regard to Plato's theory of ideas?

50. What is "substance," as distinct from "property"? What are the three significations of the word "substance"?

70. Do we know the mind as object, or as cause only? Explain the difference?

90. What is Cousin's theory of "the origin of the idea" of God? What does he mean by calling God "the Universal Reason"? What inference may we draw from this, as to the nature of God?

XVII.

1. State some of the changes that may be made in propositions and show the analogy between this method and mathematical analysis.

2. What was Kant's theory of knowledge? What was Fichte's application of it to the external world?

3. In what sense is every object in nature "a cause"? in what "a force"? Are "cause" and "force" abstract or concrete terms when so used?

4. What was Cousin's theory of "ideas" in relation to the acquisition of knowledge?

5. Show that every object in nature and every state of an object may be regarded as a term in a series, (1) with regard to organic beings, (2) to inorganic.

XX.

1. State and illustrate the principle of identity and contradiction as a test of truth.

2. What is Sir William Hamilton's theory of knowledge—"presentative" and "representative"? What its relations to the materialism of Herbert Spencer?

3. Are there any "causes" or "forces" in nature besides material objects? What are "laws"—"the laws of Nature"?

4. What proof have we that the mind or soul is immaterial? What is the bearing of this on the doctrine of immortality?

5. What attributes do the acts of "creation" in the origin of "species" and "series" imply in the Beings who performed them? What influence does the certainty of such acts have on our expectations of a Special Providence and miraculous interpositions after creation was completed?

VIII. PHYSICAL SCIENCES.

I. CHEMISTRY.—PROFESSOR SCHAEFFER.

1. Explain the following terms:—atom, molecule, element, symbol, formula, atomic weight, molecular weight, equivalence.

2. What is meant by the law of definite proportion—law of multiple proportion? Give examples.

3. When the same elements unite in more than one proportion how are resulting compounds named?

4. What is a compound radical?

5. What is an acid? a base? a salt? How are they named?

6. What is a normal salt? What an acid salt?

7. Explain the relation between the density of a gas and its molecular weight. Give examples.

8. The molecular formula of a substance being given how may its percentage composition be obtained?

9. Give the distribution, preparation and properties of chlorine and sulphur.

10. Explain the process of combustion.

2. PHYSICS—PROFESSOR ANTHONY.

I. MECHANICS.

1. Define the terms (*a*) force, (*b*) work, (*c*) energy, (*d*) resultant and (*e*) component.

2. Define the terms (*a*) velocity and (*b*) acceleration.

3. A force of 8 kilogrammes acts toward the right, another parallel force of 6 kilogrammes acts toward the left at a distance of 12 c. m. from the first. Determine completely the resultant.

4. When a body is moved by a constant unbalanced force, (*a*) what is the nature of its motion? (*b*) What is the relation of the acceleration to the force and mass? (*c*) What relation between time and velocity acquired? (*d*) Between time and space passed over? (*e*) Between velocity and space?

5. A body A moves in the arc of a circle of 5 ft. radius with a velocity of 30 ft. A body B moves in a circle of one-half the radius with one-half the velocity. What is the ratio between the centrifugal forces developed?

6. (*a*) What is the relation between the ordinary and absolute units of force, if feet and seconds are the units of length and time respectively? (*b*) What if yards and minutes are the units of length and time?

7. What is the resultant of the forces 5 and 7 making an angle of 120°?

8. Find the centre of gravity of a circular disc of which one half is iron and the other half wood, joined along a diameter of the disc, the iron being 8 times as heavy as the wood.

9. (*a*) A mass of 100 lbs. moves with a velocity of 500 ft. What is its energy in ft. lbs.? (*b*) How far would it penetrate into a bank of earth offering a constant resistance of 100 lbs.?

10 How high will a body rise when projected upward with a velocity of 1000 feet?

11. How is the pressure due to the weight of a liquid computed?

12. State the principle of Archimedes.

13. (*a*) State Mariotte's law. (*b*) How can it be demonstrated experimentally?

14. Into what space will a quantity of air measuring 1 cu. ft. at the standard atmospheric pressure be compressed by a column of water 330 ft. high in an open tube (33 ft. = 1 atmosphere)?

II. ELECTRICITY AND MAGNETISM.

1. *a.* Describe the phenomena of statical induction. *b.* Apply to electrophorous and Holtz machine.

2. What are the general laws for the mutual action of electric currents? Apply to the case of a radial current flowing from the centre outward, acted upon by the earth current.

3. A Battery of 40 cells, each of 2 ohms resistance, and E. M. F. 1 volt, is arranged in series and the current divided between three telegraph lines, respectively of 3500, 7000, and 6500 ohms resistance. *a.* What is the entire external resistance? *b.* What is the entire resistance? *c.* What is the entire current? *d.* What current will flow through each line?

4. Describe the experiments to be performed to obtain the strength of a current in absolute measure.

5. *a.* Give the general law for the direction of an induced current. *b.* What current will flow through a vertical wire forming part of a closed circuit, when the wire is moved southward? *c.* When it is moved eastward?

III. HEAT.

1. What is meant by the coefficient of expansion of a body? Coefficient of apparent expansion of a liquid? In a centigrade thermometer. what must be the relation between the volume of the tube between 0° and 100°, and that of the bulb including that portion of the tube below 0°?

2. What is the theoretical velocity of air in a ventilating flue whose height is 50ft. and temperature 27° C., the external temperature being 7° C.?

3. Describe ebullition and the accompanying phenomena. What is the tension of the vapor from a boiling liquid? Effect of pressure on the boiling point. Why?

4. Water is compressed $\frac{45}{1000000}$ of its volume by a pressure of one atmosphere, what force will be required to resist the expansion for an elevation of temperature of 20°? coef. of expansion .00024.

5. Which has the greater density, air at 10° and pressure 70, or air at 30° and pressure 80?

6. What is meant by the "Spheroidal State?" State what facts you know in connection with it.

7. What is the unit of heat? What is specific heat? A body weighing 5 grammes is heated to a temperature of 100°, then plunged into 10 grammes of water at 10°, the common temperature finally reached is 12°. Required spec. heat of body.

IV. ACOUSTICS AND OPTICS.

1. (*a*) What is meant by a musical interval? Compute the intervals between the tonic and each note (*b*) of the major scale, (*c*) of the minor scale. (*d*) Point out the difference between the two scales.

2. Give the evidence that sound is propagated through the air by a vibratory motion.

3. *a*. What are laws of regular reflection of light? *b*. Where is the image caused by reflection from a plane mirror? *c*. Where is the image produced by a concave mirror, if the object is at an infinite distance? *d*. What changes will take place in the position and size of the image produced by a concave mirror, if the object approach from an infinite distance to very near the mirror?

4. *a*. What are the laws of refraction of light? *b*. Show in what way a prism deviates the rays. *c*. What is meant by the minimum deviation by a prism, and when does it occur?

5. *a*. State the evidence in favor of the undulatory theory of light. *b*. What evidence in relation to the direction of the vibration? *c*. How does a thin piece of selenite restore the light when placed between the polarizer and analyzer? *d*. How are the colors in this experiment accounted for?

3. ASTRONOMY—PROFESSOR POTTER.

I. Explain the difference between Sidereal and Solar days.

II. Explain the origin of the elements composing the Equation of time, and show the relation of that Equation to apparent and mean time.

III. Give the amount, and explain the cause of Precession, and show its relation to the Tropical year.

IV. Define the Sidereal, Anomalistic, and Civil years.

V. Show the relation of Aberration to the velocity of light, and to the Earth's orbital motion.

VI. Explain the method of computing the distance of an Inferior Planet by means of its greatest Elongation.

VII. Given the altitude of the Pole Star, to find the latitude of the place.

VIII. Compute the Longitude, Right Ascension and Declination of the Sun, any one of those quantities and the obliquity of the Ecliptic being given.

IX. Given the meridian altitude and Declination of a heavenly body, to find the latitude of the place.

X. Find the time by a single altitude of the Sun, and deduce therefrom the longitude of the place, by the chronometer.

XI. Deduce the value of the Lunar ecliptic limits, and show when an eclipse of the moon is impossible and when inevitable.

XII. Give Kepler's third law, and show the application thereof to the finding of the Sun's horizontal Parallax, by observing the transit of Venus.

IX. RHETORIC, ORATORY AND GENERAL LITERATURE—PROFESSOR SHACKFORD.

I. ENGLISH COMPOSITION.

FIRST YEAR, FIRST TERM.

1. How can an element of a sentence be expanded? Give an example.

2. What is meant by the Unity of a sentence?

3. What faults of construction detract from Strength of expression?

4. State what Rhetorical principles are violated in the following sentences:

(*a*) "When I attempt to make a nearer acquaintance through the medium of Danish, they are shy and shrinking to such an extent that they do not attempt to conceal it."

(*b*) His dormant affections quickly awakened to fasten themselves pertinaciously around the timely object. His thoughts began industriously to shape out for himself a new future, which should embrace, as a setting, its appropriate jewel, a brilliant and prosperous career for this young hope of his house.

(*c*) What Skimpole wished to appear, La Fontaine was; a self-unconscious humbug, the one; simple and without guise, the latter.

(*d*) She has lectured one hundred nights, traveled several thousand miles, and written a book on Ethics, and all within a year—which is doing well, if she is a woman.

(*e*) I never failed in a solitary case to far exceed the hopes of my class.

(*f*) It is well calculated to develop those rational faculties, which, in the old system, were left to develop themselves.

5. How is Simplicity a relative quality in the choice of words?

6. Construct a Periodic, and change it into a Loose, sentence.

7. Mention some of the ways of varying a sentence.

8. When are *on the contrary, on the other hand, conversely, obversely*, used as links between sentences?

9. Mention some of the methods of building up a paragraph.

10. Consider in detail the following paragraph in regard (*a*) to the construction of the several sentences; (*b*) to the choice of words; (*c*) to its conformity to the rules of the Paragraph:

(1) "The attempt has utterly failed, even when made under the most favorable conditions for success. (2) For instance, the French Academy, containing the great body of the distinguished literary men of France, once sought to exercise such a domination over their own language, and, if any could have succeeded, might have hoped to do so. (3) But the language recked of their decrees, as little as the advancing ocean did of those of Canute. (4) They were obliged to give way, and in each successive edition of their dictionary, to throw open its doors to words which had established themselves in the language, and would hold their ground, comparatively indifferent whether they received their seal of allowance or not."

2. ENGLISH COMPOSITION.

SECOND TERM.

I.

1. From what does Antithesis derive its force?

2. What is necessary to make a resemblance a Figure of Speech?

3. What conditions must be satisfied when a Figure of Similarity is employed to aid the understanding?

4. Exemplify the difference between the Antithesis and the Epigram.

5. State the chief means of attaining Brevity.

6. What principles of Arrangement aid the understanding of a complex statement?

7. What are the conditions in the employment of language to excite Pathetic emotion?

8. Explain what is meant by the permanent, and the variable element in Taste.

II.

9. From what does the Simile derive its force?

10. Mention forms of Antithesis in which the contrast is of a secondary kind.

11. State the nature and object of Fictitious Examples.

12. Explain the nature and effect of Innuendo.
13. How does Variety contribute to Strength?
14. Why do many scenes and works of Art please after frequent repetition?
15. How is the effect of Ludicrous degradation softened?
16. In what ways is language made to produce æsthetic effects?

III.

17. From what does Metonymy derive its force?
18. What conditions are necessary to render Metaphor a source of pleasure?
19. State the nature and limits of the Hyperbole.
20. What is the Identical assertion? Seeming Irrelevance? Extreme case?
21. State the three kinds of violation of Brevity.
22. Mention the conditions essential to Sublimity.
23. What are the elements that enter into Wit?
24. What are the conditions of Melody in the construction of clauses and sentences?

3. HISTORY AND ELEMENTS OF THE ENGLISH LANGUAGE.

FRESHMAN YEAR, THIRD TERM.

1. State briefly the foreign influences that have operated in the growth and development of English.
2. What Scandinavian peculiarities are found in English etymology and syntax?
3. What has brought about the dropping of inflections?
4. Indicate the character of the changes that have taken place since the 14th century.
5. What division into Periods is generally made?
6. What are the terminations of nouns that have come from the French?
7. Whence do we get the words *geology, seraphim, algebra, orrery, reynard, parchment, magnet, imp, snow, second, three, uncle, domestic, stentorian, amen?*
8. Give the reason in each case for calling the following words Anglo-Saxon: *good, go, old, quicken, knock, father, goose, sun, buzz, three, fourth.*
9. Why is an Anglo-Saxon style strong and picturesque?
10. Name some words where the noun is Anglo-Saxon and the adjective of foreign origin.
11. Explain *free-mason, beef-eater, grocer, brand-new, island, shame-faced, Charles' wain, twilight.*
12. What are the two great Landmarks of the Semi-Saxon period?
13. What is the explanation of synonymous words often used in pairs?

14. Explain the following forms: *did, its, mine, here, once, him, whom, whilom, be* and *gain* as prefixes.

15. Give the force of the adjective suffixes, *y, en, ly, ed, ish, ern, ive.*

16. What is the relation between consonants in English and in German?

17. State the three ways of expressing the relation between the parts of a compound, with an example of each way.

18. Trace the origin of several particles.

19. State some of the causes of the anomalies in English orthography.

20. What are the peculiar characteristics of the verb?

21. Give the principal formatives of the verb, and their force.

22. To what can the substantive verb be traced back in all languages? Why called substantive?

23. Explain the auxiliaries *may, can, shall, will, should, would, could, do.*

24. How does a foreign word become naturalized?

25. What principle operates in causing the change commented upon in the following words: "As the pupils grow older, they do not care to read about a fair lady, but they are at once drawn to a female possessing considerable personal attractions. A brawl is a word good enough for a scuffle between peasants; but between aldermen the brawl becomes a fracas. An emeute is a far genteeler word than a riot. A farmer prides himself upon being an agriculturist."

26. Make a list of the Anglo-Saxon words, and of those of French origin in the preceding quotation.

27. Make a list of the symbolic and the presentive words.

28. Indicate the terminations for causative, intensive, frequentative, and inceptive verbs.

29. What are the three kinds of syntax?

30. State the principal heads under which changes in words may be classified, with an example of each class.

4. RHETORIC.

FOURTH YEAR, FIRST TERM.

1. The Division of Arguments.
2. The Sign.
3. Concurrent Testimony.
4. The "Idola" of Bacon.
5. The Progressive argument.
6. Analogy.
7. Inductive and Syllogistic Reasoning.
8. The Burden of Proof.
9. The Rebutting of Presumption.
10. Invented Examples as Argument and as Ornament.

11. Direct and Indirect Refutation.
12. The Use of certain Ambiguous Words, with three examples.
13. The Statement of Objections.
14. The different kinds of Introduction, with examples.
15. The Peroration.
16. The Address to the Feelings, and to the Understanding.
17. Indirect Description.
18. Perspicuity in the Construction of Sentences.
19. Energy as effected by the use of Tropes.
20. The Suggestive Style.

5. ANCIENT ORATORY.

SENIOR YEAR.—SECOND TERM.

1. What was the function of the orator at Athens?
2. What were the divisions of ancient oratory?
3. What limitations in the modern use of the word oratory?
4. Whence are oratorical rules derived?
5. What circumstances gave to Athenian oratory its peculiar development?
6. What are the leading points of difference between that period and our time?
7. What is the connection between oratory and democracy?
8. Give an account of the first political orator at Athens.
9. The character, style, and influence of Georgias.
10. Who were the prominent sophists? What was their relation to Grecian culture?
11. By whom was "The lives of the ten orators" probably written?
12. What were the peculiarities of the style of Lysias?
13. State the peculiar features in the life, character and position of Socrates?
14. Plato's view of Rhetoric in the Georgias, and in the Phædrus.
15. His view of the essential opposition of the philosophical to the political life.
16. What were the characteristics of Demosthenes' style?
17. Who were the leaders of the Macedonian and the Anti-Macedonian party?
18. Compare Demosthenes and Cicero.
19. State what were the characteristics of the decline of eloquence.
20. Name the different periods of Roman eloquence after the Italian period.

6. COMPARATIVE LITERATURE.—FOURTH YEAR.—THIRD TERM.

[*Ten topics assigned to each student.*]

1. In what respect is all criticism comparative?
2. What is "disinterestedness" in criticism?
3. Give a definition of literature.
4. How does Hegel classify the different kinds of poetry?
5. What is meant by Aristotle's aphorism, "Poetry is truer than history?"
6. In what do present methods of literary criticism differ from past?
7. What is Sainte Beuve's idea of a classic writer?
8. Give a concise statement of Romanticism and Classicism in literature.
9. What gives a work a place in Universal literature?
10. Why is the Fable one of the earliest forms of literature?
11. State the characteristic features of La Fontaine, and the points of difference between his fables, those of Æsop, and those of India.
12. How far is poetry an "imitative" art, and what are the limitations to the term?
13. Illustrate, by epic, elegiac and iambic verse the necessity and æsthetic value of rhythmic expression.
14. What is peculiar to Hebrew poetry?
15. State the theories concerning the Homeric epopee.
16. In what does epic unity consist? lyric? dramatic?
17. Mention the great national epics, and the features which they have in common.
18. What is meant by epic "machinery," and how can the term be applied to Homer and Virgil?
19. Give De Quincey's view of an Achilleis.
20. How does the Nibelungenlied illustrate the formation and growth of the national epic?
21. State your idea of Tennyson's Idyls of the King as an epic.
22. Show some of the characteristic differences between the drama of Æschylus, Sophocles, Euripides and Shakespeare.
23. Give a brief account of the "Prometheus," "Antigone," and "Medea."
24. Mention the leading characteristics of the comedy of Aristophanes.
25. State and criticise Taine's estimate of Milton.
26. What was the origin and function of the Greek chorus?
27. When did History first take its place as a distinct form of literature in Greece?
28. What are Aristotle's reasons for assigning to the drama a higher place than to the epopee?
29 State the characteristic features of Roman literature.

30. What is the chief distinction between the French and English drama at the period of highest development, and what is the leading cause of that difference?

X. MILITARY SCIENCE.

TACTICS, FIELD FORTIFICATION, ETC.—LT. VAN NESS.

1. Give the commands and explain how a battalion in column of fours may be rapidly thrown to the front in line of battle.
2. By what commands and movements may a battalion in double column be deployed to the right or left into line of battle?
3. What are the functions of each of the three arms of the service: infantry, cavalry and artillery?
4. Explain the composition and duties of the advance guard of an army in the field.
5. State the object of outposts, and how they are disposed.
6. Draw a plan of a bastioned fort, and describe the mode of constructing such a work of earth.
7. Explain the manner of constructing bomb-proof shelters and powder magazines.
8. Describe the three kinds of cannon now in use, and the projectiles which pertain to each.
9. Describe the time, concussion, and percussion fuzes.
10. Describe the Bormann time-fuze.

III. TECHNICAL COURSES.

The studies of the first two years of each of the Technical Courses are to a large extent the same as those of the first two years in the course in science. Hence, the examination papers that follow relate to studies of the third and fourth years of the respective courses.

I. AGRICULTURE.

[*Besides the papers given below, all those on Botany and Economic entomology in the special department of Natural History are included in the course in Agriculture also.*]

I. AGRICULTURAL CHEMISTRY—PROFESSOR CALDWELL.

I. JUNIOR YEAR—FIRST TERM.

1. What is meant by the terms "specific gravity" and "specific heat?" How are the specific heat and specific gravity of a body determined?
2. Illustrate by examples and explain the absorptive power of solids for gases.

3. Describe and explain the phenomenon o. osmose.
4. What relations do heat and electricity bear to chemical change?
5. Name the elements that compose most of the known mass of the earth in the order of the abundance of their occurrence.
6. Five pounds of nitric acid and eight pounds of ammonia may be conveyed to the soil of an acre in the annual rainfall. How much would it cost to supply an equal quantity of nitrogen in the form of ammonic sulphate, containing 90 per cent. of pure salt, and costing six cents per pound?
7. What are the chemical changes that accompany the germination of seeds?
8. What changes in the condition of the surrounding atmosphere are produced by growing plants?
9. What are the relations between fermentation, putrefaction and life?
10. What are the proofs that soil is derived from the rocks?
11. Describe the main features of water-culture experimentation.
12. How would you proceed to investigate the function of an ash ingredient of a plant?
13. In what form must the sulphur required by the plant be supplied in its food?
14. Discuss the occurrence, necessity and function of sodium, with respect to vegetable growth.
15. Describe the principal steps in a quantitative gravimetrical analysis.

II. JUNIOR YEAR—SECOND TERM.

1. Why does a soil rich in humus absorb more oxygen than one poor in humus?
2. What interesting result is produced when a solution of an ammonium salt is passed through a portion of soil, and how can it be proved that the phenomenon is not a case of mere displacement of the solution already in the soil?
3. Explain the chemistry of the action of zoolites as absorbents of plant food.
4. How is it proved that zoolites are present in an arable soil?
5. Is or is not any part of the absorbent power of the soil attributable nearly to its porosity, and upon what experiments do you base your answer?
6. What oxide takes special part in the absorptive power of the soil for phosphoric acid?
7 Are nitrates absorbed by the soil? Give the reason for your answer.
8 If the soil of an acre one foot deep weighs about 3,000,000 pounds, and a fair dressing of guano, containing 10 per cent. of nitrogen, is 300 pounds; what bearing have these facts in illustration of the practical value of a soil analysis?

9. What are the chemical properties of humus?

10. What is the evidence that shows that plants do not get their carbon from the humus of the soil in which they grow?

11. What is the relation between the amount of combined nitrogen conveyed to the soil in the atmospheric precipitations, and the amount required by the crops?

12. How does the agricultural value of a lime yielded by dolomite compare with that yielded by limestone? Give the reason for your answer.

14. What part may lime play in a soil containing much nitrogen in the form of organic remains?

15. Explain the chemistry of the conversion of insoluble into soluble phosphate.

16. About what proportion of its manurial value does fodder lose in its conversion into manure by the animal?

2. VETERINARY MEDICINE AND SURGERY—PROFESSOR LAW.

I. VETERINARY ANATOMY AND PHYSIOLOGY.

1. Describe the shoulder joint in the horse stating particularly the various means by which the bones are retained in apposition.

2. What is the principal thoracic muscle engaged in quiet respiration? State its mode of action and whence it derives its nerves?

3. What muscles coöperate to open the glottis? What is the difference (as regards their origin) of the motor nerves of these muscles on the right side and the left?

4. State what you know of the changes in the air and blood effected in respiration:—of the quantity of air taken in at each inspiration in the horse:—of the amount of deterioration effected by each successive inspiration of the same air;—and the stage at which re-breathed air becomes uninspirable.

5. How would you treat asphyxia in the newborn and adult?

6. What would be the effect of closure of the nostrils in the horse and why?

7. Describe the position and extent of the frontal sinus in the horse and ox.

8. Describe the parotid gland:—its structure, its position, and the course of its duct;—and state the main uses of saliva.

9. Mention what you know of the functions of the liver and the uses of bile.

10. In which of the domestic animals are the intestines the longest and in which the most capacious? What relation does length of intestine bear to the nature of the food and the size of the stomach?

11. State the main differences, in composition and chemical reaction, of the urine of carnivora and herbivora, together with the causes.

12. What causes the sigmoid curve in the penis of the bull? State its pathogenic influence in cases of urinary calculi.

13. Describe the membranes of the fœtus in the later months of gestation, and state the uses of the water bags during pregnancy and parturition.

14. State the leading principles to be considered in seeking to improve animals by breeding.

15. Describe the mode of union of the pedal bone and the hoof wall in the horse.

II. VETERINARY MEDICINE AND SURGERY.

FIRST TERM.

1. What are the general symptoms and phenomena of fever?

2. What special features distinguish cancers from simple tumors?

3. How would you proceed to disinfect a wooden building, containing straw or hay, the building having been occupied by the victims of lung fever?

4. Enumerate the more serious contagious fevers of cattle?

5. In what respects do the malignant carbuncular afflictions differ from the specific contagious fevers? State the general causes and the characteristic lesions in the blood and tissues in the first.

6. State the symptoms and course of the intestinal fever of swine (hog-cholera).

7. Mention the climatic conditions necessary to the maintenance of Texan furr in cattle.

8. Enumerate the common gastric and intestinal parasites of the horse. State the portions of the alimentary canal in which they are respectively found and whether they infest other organs or what.

9. What parasites cause urinous bronchitis in horse, ass, ox, sheep and swine respectively? What are the symptoms of their presence, and the treatment demanded?

10. What different features and habits in the mange producing acari lead to the varying inveteracy of the existing disease?

11. What are the best general parasiticides for parasites living on the skin?

12. What causes tinea tousurans in animals? State the symptoms and treatment.

13. State the causes, symptons and treatment, of goitre in the domestic animals.

14. What conditions give rise to *roaring* in horses?

15. How would you distinguish laryngitis and pharyngitis in the horse?

16. State the distinctive symptoms of *nasal gleet, pus in the nasal sinuses, nasal discharge from diseased teeth, and collections of pus in the guttural pouches.*

III. SECOND TERM.

1. State the common causes of *facial paralysis* in the horse, with the symptoms and treatment.

2. State the symptoms of *amaurosis*, the usual lesions, what cases are curable and what incurable, and the treatment in the different cases.

3. State the symptoms and lesions of *cataract* and what treatment is desirable.

4. A horse has chronic fœtid discharge from the nose, falls off in condition, has occasional slight colicky pains, and drops portions of his food half chewed; what is probably amiss and how can it be remedied?

5. How would you distinguish *inguinal hernia, hydrocele, sarcocele?* What treatment would you advise in each?

6. State the common causes of acute and chronic tympany in oxen, and what can be done to relieve.

7. Give the causes and symptoms of gastric tympany in the horse, and state how it differs in gravity from that of oxen.

8. What functions are fulfilled by the liver in addition to the secretion of bile? What diseased conditions may be brought about by impairment or suspension of these functions?

9. What species of worms is most commonly found in the blood-vessels of the horse? What symptoms arise from their presence in the anterior mesenteric artery and its divisions? What can be done to relieve?

10. State the symptoms of ordinary and capillary bronchitis, and how they can be respectively distinguished from those of worms in the lower air passages, pneumonia and pleurisy? Furnish general principles for treatment.

11. How does the hepatized lung of ox and pig differ from that of the horse or dog?

12. State the general causes and results of periostitis in metacarpal and digital bones, also the treatment in the different stages.

13. Describe the peculiarities of gait characteristic of lameness in shoulder, elbow and foot respectively, and give an explanation founded on anatomical and physiological data.

14. Describe the various conditions causing *knee sprung*, or starting forward at the carpus.

15. Mention the various structural lesions and functional disorders which may cause lameness in the shoulder.

16. Enumerate the disorders which are especially dependent on damp undrained land.

3. APPLIED AGRICULTURE.—PROFESSOR ROBERTS.

I. SENIOR YEAR—FIRST TERM.

1. State how air, water, heat, and light influence the fertility of the soil and the growth of plants.

2. Explain how formed, classify, and give the leading characteristics of soils; also note their adaptation to the growth of grain and grasses.

3. State what climate and soil is best adapted to the growth of cereals.

4. What to clover and the various root crops.

5. How much change in altitude gives a change of one degree in temperature? In this connection give the reason for frost appearing in the lowlands before it does on the adjoining hillsides.

6. State the subjects to be taken into consideration in the selection of a farm placing them in the order of their relative importance.

7. Fields—how laid out.

8. Fences—manner of construction and material used.

9. Plans for construction, and materials for farm buildings.

10. Farm yards and water privileges.

11. Farm house surroundings.

12. Farm accounts—how kept.

13. What are the objects sought by general tillage? How may we best accomplish them?

14. State the benefits arising from the mechanical division of the soil, and explain how we may often accomplish the same result by utilizing the forces of nature.

15. Give in brief the method of the preparation of the soil, planting, harvesting, and marketing of cereals: also, kind, quality, and mode of application of fertilizers.

16. Give in brief the manner of manufacturing, preserving and applying farm yard manure.

17. Give those elements which are most liable to become exhausted from severe cropping.

18. Give the reasons for rotation of crops. and state the amount of Ammonia, Phosphoric acid and Potash that is removed from an acre by a single crop of wheat of twenty five bushels per acre, allowing the straw to weigh three hundred pounds.

II. SENIOR YEAR—SECOND TERM.

1. Give the history and characteristics of Short-horns.
2. Holsteins.
3. Ayrshires.
4. Jerseys.
5. Explain the laws of transmission or likeness.
6. Of variation.
7. State when a prepotent animal is valuable and when not.
8. Draw a circular diagram of the pedigree of the short-horn bull St. Valentine, tracing it through all its branches, and down to the first volume of the English herd-book, and give the per cent. of alloy blood, if any.
9. Give a synopsis of the history of the four leading breeds of swine.

10. State the leading characteristics of each breed and its adaptation to locality and circumstances.
11. Give the reasons why young animals will gain more pounds gross in proportion to the food consumed than old ones.
12. Give the history and comparative value with reference to nearness or remoteness from large cities and cheap lands, of the following breeds of sheep:
13. Spanish Merinos.
14. Southdowns, or Mutton Sheep.
15. Combing, or Long-wooled Sheep.
16. Give the summer and winter management of Sheep and Lambs.
17. Time of shearing, mode of handling, and marketing the wool.

III. SENIOR YEAR—THIRD TERM.

1. What are the injurious effects arising from surplus stagnant water in the soil?
2. Distinguish between moistness and wetness of soils, and illustrate by diagrams.
3. What are the effects produced on soil, climate, and plants by thorough drainage.
4. Explain the Elkington system by diagram and state when it can be advantageously applied.
5. Measure, lay out, and map for thorough drainage, the east field on the farm.
6. Give specifications and estimates for the same, locate silt basins, also give size and kind of tile.
7. Give the method of the preparation of the soil, planting, and cultivation of Indian corn. Explain by diagram and give reasons for the same.
8. Describe the mode of raising roots by both flat and ridge culture, and give their value as food for animals, as compared with English hay.
9. Give in brief the history of the thorough-bred horse.
10. Enumerate and describe the leading breeds of draught horses.
11. Sketch "Goldsmith Maid." Note and number on the margin the exterior points.
12. Compare each of these with the points in the draught horse, and state wherein the mechanical proportion and general conformation may, and should differ.
13. Give the most approved methods of educating and training a young horse.
14. Illustrate with a horse on the campus the manner of subduing those that are vicious and wild.
15. Give stable management for road and farm horses.
16. Give the common and scientific name of each of the various forage plants.

17. Give their comparative value as food for domestic animals.
18. State how and when they should be cut and cured.
19. Collect and name ten species of weeds and state the best methods of eradication.
20. Name the parts in the Reaper and Mower that are most liable to get out of repair.
21. Point out those parts where the greatest loss of power is sustained from concussion, and the remedies for the same.
22. Illustrate by diagram, the principles and attachments of a horse hay fork and conveyor.

4. HORTICULTURE—PROFESSOR PRENTISS.

1. Name the so-called small fruits.
2. Give the botanical name of each, and state the Natural Order to which it belongs.
3. Write out a brief treatise on the cultivation of the small fruit you regard as most valuable.
4. Propose a plan for a fruit garden of two acres which shall admit of the highest degree of economy in its thorough cultivation.
5. Give a classification of the diseases of plants.
6. Give a description of those which are most injurious to fruits.
7. Mention the diseases of all our drupaceous fruits, and state the most approved remedies.
8. Give your opinion as to the relationship of forest growth to climate.
9. Define landscape gardening, and name the different styles and schools.
10. Characterize the different styles.

II. ARCHITECTURE—PROFESSOR BABCOCK.

I. EXAMINATION IN BUILDING MATERIALS AND CONSTRUCTION.

1. Name the stones commonly used in building, and classify them geologically.
2. What is lime?
   " " hydraulic lime?
   " " cement?
   " " Portland cement?
   " " plaster Paris?
   " " selenitic mortar?
3. Explain the proper method of making concrete, and give the formula for the ingredients.
4. Name the kinds of wood commonly used in building.
5. Name the different methods of dressing stone.
6. Name and sketch three kinds of facing work in stone walls.

7. Show by sketches the English bond, the Flemish bond, and the common bond.

8. Name the best methods of seasoning timber.

9. What is dry-rot? and how can it be prevented?

10. What metals are commonly used in building?

11. Name and sketch the common forms of arches.

12. Of what is glass made; and what are the ordinary kinds?

13. Define the following terms: Stylobate. Pediment. Battlement. Architrave. Skew-back. Pillar. Pilaster.

14. Name the parts of an entablature.

15. Sketch a king-post truss.
" " queen " "
" " hammer beam truss.
" " collar " "
" " Howe "

16. Name the essential parts of the construction and finish of a wooden stair-case.

17. What materials are used for the outer covering of roofs?

18. Why is sand mixed with the lime in making mortar?

19. What is a compound pier?

20. What metals are bases of the paints in common use?

2. EXAMINATION IN MECHANICS.

1. Define Mechanics; name its subdivisions; and state to which one of them our discussion has been limited.

2. What is a *structure?*
" " " *machine?*

3. What is *force?*
" " *equilibrium?*

4. Define stiffness.
" strength.
" toughness.

5. Define Resolution of forces, and composition of forces, and illustrate by the parallelogram and polygon.

6. What is the *moment* of a body?

7. Sketch a queen-post truss, with braces; name each piece; and state which are ties, and which are struts.

8. State the methods of analyzing a king-post truss graphically.

9. What is the deflection of an oak beam, 20 ft. long, 8x12, carrying a load of 1,000 lbs. at the middle point?

10. Explain the method of finding the centre of gravity of a quadrilateral.

11. Explain the method, and give the formula, for finding the centre of gravity of a figure which is the difference of two figures.

12. What are the four ordinary modes of rupture in an arch?

13. Explain the method of determining the horizontal thrust at the crown of an arch.

14. Explain the method of determining the direction and value of the thrust at the foot of a rafter.

15. How is the position of the neutral axis in a beam determined?
16. What is the ratio of a load at the middle point of a beam to an evenly distributed load which will produce the same deflection?
17. Explain the method of determining the line of resistance in a pier.
18. Explain the method of determining the line of resistance in an arch.
19. To what forces is a loaded beam subjected, and in what part of the beam does each of them act?
20. Explain the principle of the lever, and the method of determining the common centre of gravity of two weights.

3. ARCHITECTURE.

WINTER AND SPRING TERMS.

1. Make a sketch showing the general arrangements of a Christian Basilica, and name the various parts of such a building when fully developed.
2. What is the characteristic feature of the Basilican style? of the Byzantine? of the Lombard? of the Italian Romanesque?
3. Define the following terms: Triforium. Narthex. Campanile. Pendentive. Baptistery. Baldacchino.
4. Name the subdivisions of Romanesque Architecture.
5. Name the two best examples of Byzantine Architecture, and give their dates.
6. Explain the general treatment of the bell of a capital in the Romanesque styles, and sketch the typical forms.
7. What methods of decorating the interior surfaces were in use during the Byzantine period?
8. Name the style to which each of the following buildings belong: The Cathedral at Worms. St. Nicholas, Bari. Santa Fosca, Torcello. Cathedral at Pisa. San Miniato, Florence. San Ambrogio, Milan. Cathedral at Spires. Notre Dame, Clermont. Cathedral at Rheims. Cathedral at Canterbury. St. George, Bocherville. Tower of Earl's Barton.
9. What are the subdivisions of Gothic Architecture?
10. Sketch a plan of a fully developed Rib-Vault, and name the parts.
11. Sketch and name the typical forms of the vaulting used in the later English Gothic buildings.
12. Sketch the sections of the different kinds of Bowtells.
13. Sketch a plan of a Romanesque compound pier, and the arch supported by it.
14. Explain, and show by sketches, the difference between plate-tracery and bar-tracery.
15. Explain and sketch the methods of effecting the transition from the square tower to the octagon spire.

16. For what purpose was the pointed arch first systematically used?
17. Show by a sketch the construction of a sexpartite vault.
18. Give the dates of the three periods of English Gothic Architecture.
19. Why was the flying buttress introduced?
20. Which is the best Gothic Cathedral in France? Which is the best Gothic Cathedral in England? Which is the best Gothic Cathedral in Germany?

III. CHEMISTRY AND PHYSICS.

CHEMISTRY—PROFESSOR CALDWELL.

1. QUALITATIVE ANALYSIS.

SECOND YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used, to prove, both the presence of these elements, and the absence of all others: if possible, write the equations representing the final reactions by which you prove the presence of each of the elements mentioned.

1. As_2O_3, $SnCl_2$, $Pb(C_2H_3O_2)_2$, $Bi(NO_3)_3$, NH_4Cl, KCy.
2. K_4FeCy_6, HNa_2PO_4, $(NH_4)_2C_2O_4$, $Na_2B_4O_7$.
3. $Pb(C_2H_3O_2)_2$, $AgNO_3$, $HgCl_2$, Na_2SO_3, $(NH_4)_2C_2O_4$, Na_2SO_4.
4. $FeSO_4$, FeS, Cr_2O_3, Al_2O_3, $CuSO_4$, Hg_2Cl_2, $SnCl_2$.

2. QUANTITATIVE ANALYSIS.

THIRD YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the quantitative analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used.

1. Cupric sulphate, (the copper being precipitated as hydride).
2. Brass.
3. Rochelle salt (estimation of potassium and sodium).
4. Ferric phosphate.
5. Type metal.

3. CHEMICAL PHILOSOPHY.

THIRD YEAR, FIRST TERM.

1. What weight of Hydrogen is required to raise a weight of

5000 gms., and what would be its volume at —17° C. and 255 mm. barometric pressure.

2. How much iron would be required to produce that amount of Hydrogen. $Fe + H_2SO_4 + aq = FeSO_4 + aq + H_2$.

3. Define molecule. What is a simple, and what a compound molecule? Give examples.

4. What is meant by atomic and what by molecular weight? Show how the laws of definite and multiple proportion are in accordance with the atomic theory.

5. How may we distinguish between a mixture and a chemical compound?

6. What relation does the molecular weight bear to the sp. gr. of the molecule in the gaseous state?

7. What is the weight in criths of one liter of HCl?

8. The specific heat of a metal is .03244. It forms a compound with Chlorine containing 34.8 per cent. of Cl. What is the atomic weight of the metal and what is its quantivalence?

9. Molecular weight of potassic chlorate is 122.6, and 2.95 grs. contain 1.155 grs. of oxygen. Required the total atomic weight of oxygen, and the number of oxygen atoms in the molecule.

10. Analysis of a substance gives the following results:—C 26.57; H, 2.74; O, 71.11. Required the simplest formula, and the percentage composition calculated from that formula.

11. Explain variations in equivalence. What is the law that governs this variable power? Give examples.

12. What are condensed types? Give examples.

13. What are fat acids? In forming fat acids from alcohols, how are the positive radicals changed to negative ones?

14. Give the general formula for mixed ethers.

15. What is the rule for the termination of the positive radical, in the nomenclature of ternary compounds of the water type?

16. In case of variation of quantivalence in the negative radical, what are the terminations and prefixes used in the nomenclature of ternary compounds of the water type?

17. To what class does the compound represented by each of the following symbols belong:

CH_3	C_2H_5	C_2H_4	C_2O_2	K
H N	C_2H_5 N	H_2 N_2	H_2 N_2	Cl N
H	H	H_2	H_2	H

CHEMICAL TECHNOLOGY—PROF. BRENEMAN.

THIRD YEAR, SECOND TERM.

1. Show the general relations of the direct products of chemical industry to the indirect and waste products.

2. Describe the manufacture of the form of sulphuric acid known as chamber acid and give the characteristic properties of this product.

3. Explain the internal economy of the lead chamber with reference to the chemistry of the process and the probable localization of the different reactions.

4. Describe the Glover's tower, Sprengel jet and Faure and Kessler still used in the manufacture of sulphuric acid.

5. Give an account of the recovery of sulphur from the tank waste of the soda works and compare the different methods in use.

6. Describe the lixciviation of black ash and compare the views of Scheurer, Kestner and Kolb as to the chemistry of this process with those of Dumas.

7. Describe the rotary soda furnace and compare it with the ordinary black ash furnace.

8. Explain the ammonia soda process; give an account of its origin and discuss its commercial importance.

9. Describe in detail the manufacture of bleaching power, giving the conditions to be observed in preparation and packing.

10. Describe the Stassfurt salt deposits and show their relations to the chemical industries.

11. Explain the nature of "rosin," "olein," "mottled" and "silicated" soaps.

12. Describe the by-products of the fat acid industry and their utilization.

13. Give an account of the gas purifier and compare the different methods of purification.

14. Trace the changes in the chemical composition of coal gas from the retort to the gasometer.

IV. CIVIL ENGINEERING—PROFESSOR FUERTES.

[*Each student in this Department on entering the examination room, draws by lot a numbered card containing the subjects he is expected to discuss.*]

I. MECHANICS.

[*Papers which give only the general heading of a subject indicate that the student is expected to write, as fully as he may be able, upon the theory of the subject and also to develop and discuss the mathematical analysis.*]

I.

12. Demonstrate several methods for finding the resultant of a system of forces in space.

16. Centres of gravity.

20. Develop and discuss the formula for dynamical stability.

II.

1. (*a*) Couples. (*b*) Centrifugal force. (*c*) Centre of percussion.

III.

1. Strength of shearing: (*a*) Working load. (*b*) Rupture by shearing.

6. Action of shearing force in the plane of rupture. Value of the shearing force.

11. (*a*) Modulus of proof strength for shearing. (*b*) Power that may develop the shearing stress to the limit of proof strength for elliptical, cylindrical and tubular girders.

IV.

1. Elongation of a prismatic body in terms of the elongating force: Modulus of elasticity. The force corresponding to the elongation.

(*a*) UNIFORMLY LOADED GIRDERS.

I. *Free at one end.*—Find the tangential angle, and the ordinate giving the deflection for any point of the curve. The deflection for the middle point of the girder. The work done in producing the deflection. The deflection for a terminal load in addition to the uniform load.

II. *Girder supported at both ends.*—Find the total deflection. Prove that for a uniform load, the depression is $\frac{5}{8}$ of that produced by a local central load.

$$\text{Data}: Q = ql \qquad \delta_1 = \frac{Ps^3}{n^2 WE}$$

(*b*) HOLLOW AND WEBBED GIRDERS.

Find the measure of the moment of flexure of the following: A tubular girder. A single webbed girder with double flanges. A crucial girder. A T girder. Prove that for the same quantity of material the high webbed and flanged girder gives the greatest moment of flexure. In the case of a beam twice as deep as it is broad, find the moment of flexure when the direction of the force is parallel to the depth of the beam, and compare it with that when the deflecting force is normal to it.

(*c*) MOMENTS OF PROOF LOAD.

Prove that the moment of proof load for parallelopipedical beams increases with the width and the square of the height, while the proof load varies inversely as the length.

Also that in bodies of equal weights, masses or cross-sections, the proof loads are proportions to their heights. And that when a square beam is placed with its diagonal in the plane of the deflecting force, its proof load is 0.707 of what it would be if it were laid on its side.

$$\text{Data}: Pl = \frac{WT}{E} \qquad W = \frac{bh^2}{12} = \frac{\pi a^2 b}{4} = \frac{\pi r^4}{4} \text{ \&c.}$$

(*d*) GIRDER FIXED AT ONE END AND LOADED BY TWO PARALLEL FORCES.

Find the moments of flexure. Discuss the maxima and minima values of these moments for all positive and negative values of the pressures, and locate the points of inflection of the elastic curve.

$$\text{Data: } r = \frac{WE}{m} = \frac{WE}{Px}$$

No. 6.

Find the most general equation of the elastic curve, or

$$y = \frac{Pl^3}{3WE}$$

$$\text{Data: } r = \frac{WE}{Pa} \qquad r = \frac{(dx^2+dy^2)^{\frac{3}{2}}}{d^2y dx} = \frac{1}{\frac{d^2y}{dx^2}} \text{ nearly.}$$

Take the origin at the loaded end of a beam, fixed at one and free at the other. If you prefer Weisbach's method, take

$$WE = Pxr \qquad ds = \sqrt{1+(\tan a)^2}dx \qquad r = -\frac{ds^3}{dx^2.d(\tan a)}$$

$$\tan a = \frac{P(b^2-x^2)}{2WE}.$$

(*e*) MOMENT OF FLEXURE.

Prove that in rectangular beams, the neutral axis passes, theoretically, through the centre of gravity of the cross-section; and find the bending moment for a parallelopipedical beam, imbedded at one end and loaded at the other. Find also the radius of curvature of the neutral surface.

(*f*) FRICTION.

Find the force required to draw a body up or down upon an inclined plane under any conditions of the direction of the force and of the motion.

(*g*) FRICTION.

Find the moment of friction of a cylinder resting on its right section; also when it rests on a cylindrical ring, and when on a conical pivot.

2. LAND SURVEYING—MR. CRANDALL.

1. Assume the following field notes and magnetic bearings:

* * * * * * * *

The magnetic variation is 7 degrees, 15 minutes West. Reduce the data to the true meridian, calculate the area by latitudes and departures, prepare the plotting sheet, and from the N. W. corner of the field draw two lines that will divide the plot into three equal areas.

3. HIGHER GEODESY—MR. CRANDALL.

1. Give a brief outline of the operations required in a trigonometrical survey.

4. Find the angle and side equations, and the probable error of the side *ce* in the following sketch:

* * * * * * * *

The angles of each triangle were observed separately, with the exception of *dea* and *acb*, which were not observed at all: or the side *ae* was observed in only one direction. The base line is *ad*.

5. Required: The data for locating the boundary line, (which is the 42d parallel of latitude) between New York and Pennsylvania.

6. Describe the method of plotting a chart of small extent by means of the Polyconic Projection tables.

7. Find the length of a degree of latitude in the latitude of Cornell.

4. RAILROAD SURVEYING—MR. CRANDALL.

1. Describe the adjustments of the Dumpy Level.

3. In order to locate a railroad two trial lines were run, giving the following field notes (see sketch):

* * * * * * * *

Find the equivalent straight and level length of each, and the more economical line for a given amount of traffic.

5. Required: the frog distance, middle and side ordinates of a turnout on the outside of a 5° curve for a No. 7 frog: length of switch rail twenty feet.

5. BRIDGE CONSTRUCTION—MR. CRANDALL.

1. Define the term factor of safety and give its usual values for iron railroad bridges.

2. Discuss the Howe truss.

4. In a simple truss (as per sketch) subjected to a uniform rolling load, and taking into account the weight of the truss itself, find: (*a*) the general equation for the horizontal strains under the constant load for any point in either chord. (*b*) The horizontal strains for the same points when the moving load covers only a portion of the truss. (*c*) The greatest horizontal strain. (*d*) Discuss the results.

7. In a triple truss (as per sketch) please find: (*a*) the horizon-

tal strains at panel points of upper and lower chords of trusses No. 1, No. 2, and No. 3. (*b*) The compression in triple truss at points of No. 1, No. 2, and No. 3. (*c*) The tensions at panel points of the simple trusses.

18. State the conditions of a post and tie, under which the inclination for a minimum of material may be obtained, discuss the results of the analysis and solve any example.

6 BAROMETRICAL LEVELING—PROFESSOR FUERTES.

After making a double and simultaneous set of observations, the following data were obtained, after correcting for errors of the instruments:

Barometer columns at lower station	$= 29''.439$
" " " upper "	$= 29''.200$
Attached thermometer at " "	$= 72^\circ.08$
" " " lower "	$= 75^\circ.91$
Detached " " " "	$= 75^\circ.72$
" " " upper "	$= 72.33$
Latitude	$= 16^\circ 55'$

Cistern on field, 6 feet above cistern at standard station. Elevation of sea level, 700 feet below cistern at standard station.

Find the elevation of the upper station above the sea.

7. ASTRONOMY.—PROFESSOR FUERTES.

1. Describe the sextant, the principle of its construction and its adjustments, including the adjustment for eccentricity.

13. Assume the following data:

Ithaca, N. Y., Dec. 7th, 1874.

Upper and lower limbs of the Sun, measured, in latitude, say, $42^\circ\ 27^m\ 30'$ N, and longitude $1^m\ 40^s$ E of Washington. The mean time of observing the Sun's centre was $9^h\ 53^m\ 51^s\ 725$; and the double altitude corresponding to this time was $36^\circ\ 50^m$. The index error and all other sextant errors were $+2'\ 26''\ 25$. The chronometer keeps Albany mean time, and on the previous noon had been found $35^s\ 79$ slow. Find the rate of the chronometer, remembering that Albany is $11^m\ 32^s\ 87$ E of Ithaca.

14. Using as much as may be necessary from the above, find the latitude of Cornell, with the following additional data, taken on Dec. 5th, 1874.

Mean of the double altitudes of the Sun's centre, -	$43^\circ\ 27^m\ 30^s$
" " a. m. times, - - - - -	$10^\circ\ 29^m\ 9^s\ 09$
Index and other sextant errors, - - - - -	$+2^m\ 12'\ 5$

8. HYDRAULICS.—PROFESSOR FUERTES.

7. Discuss the theory of efflux in accordance with Prof. Eddy's method.

8. Find the theoretical discharge through circular orifices in a thin plate.

19. Find the expressions for the head, diameter, velocity and delivery of long pipes, for all velocities, taking into account all resistances. Discuss the formulæ, the manner of applying them, and the precautions to be observed in designing a system of distributing pipes.

26. Describe the conditions of efflux when an abrupt contraction takes place in a conduit by the interposition of a diaphragm, find the loss of head and the law of the coefficient of resistance, and also the coefficients of resistance and contraction when the diaphragm is removed.

34. Sketch and describe a single and a double canal lock. Find the time required for filling and emptying both kinds of locks, and establish formulæ for the water consumption under circumstances of traffic that you may assume at your will.

22. In order to judge of the relative merit of several water meters, suppose that they are made to deliver water (under the same conditions of pressure and connections) through a short horizontal mouth-piece under 12 ft. of head. One of these meters is observed to deliver a turbid stream having a horizontal range of 9.8 ft., after falling through a height of 1.67 ft.; but at a vertical distance of 3.27 ft. below the outlet, the horizontal range is 4.9c ft. Required the coefficient of velocity due to the resistances offered by this meter.

37. Find the height of swell produced by a weir when it is and when it is not submerged or drowned.

38. Find the amplitude of backwater caused by a weir.

6. Given the fall, peripheral velocity and angle from the vertical at which an over-shot wheel takes water, find the radius of the wheel, the number of revolutions, width and number of buckets.

11. Find the effect of the impact, of the weight of the water, and of the centrifugal force, in an over-shot wheel.

STEREOTOMY.—PROFESSOR FUERTES.

1. The dimensions of an oblique segmental arch bridge are as follows:

* * * * * * *

Please calculate, by Buck's system, (*a*) the oblique span. (*b*) Obliquity. (*c*) Angle of the soffit. (*d*) Length of heading spiral. (*e*) Number of voussoirs, [about 1¼ feet thick] (*d*) Thickness of voussoirs. (*e*) Length of impost. (*f*) Actual divergence of courses. (*g*) Adjusted angle of soffit and axial length. (*h*) Angles of extrados and of twist. (*i*) Adjusted eccentricity. (*j*) Size of parallel rule, distance between winding sticks at intrados and extrados, and breadth of broad end of winding stick. (*k*) Triangular template for skew backs. (*l*) Describe the manner of constructing and using the templates for the six faces of the arch stones.

2. Explain the different systems of construction in oblique bridges, and compare their relative advantages and disadvantages. Sketch the projections for the so called helicoidal, logarithmic and corne de vache arches.

10. CIVIL ENGINEERING.—PROFESSOR FUERTES.

Describe the modes of rupture of several kinds of arches. Find the pressure per units of surface upon the joints of an arch.

5. Establish Van Buren's general equation for calculating the stability of retaining walls. Discuss its applications in a general way.

7. Manipulations of mortars and concrete. Theory of mortars.

9. Classification of tunnels, their dimensions, form, etc. Running the shafts.

11. Driving the headings. Poling boards.

13. Staking out the longitudinal profile underground. Laying out the transverse section of a tunnel.

5. MECHANIC ARTS.

I. LINEAR DRAWING.—PROFESSOR MORRIS.

SECOND YEAR.—FIRST TERM.

1. To divide the line A B into any number of equal parts. Let the number be 7, 9, 13.

2. To construct a square on a given diagonal AB.

3. To inscribe a square in any triangle ABC; in a given trapezium ABCD.

4. On a given line AB construct a regular pentagon; a regular heptagon.

5. To inscribe three equal circles in a given circle.

6. The diameters being given, draw an ellipse by intersecting arcs.

7. To construct a parabola, the base AB and abscissa CD being given.

8. To draw a hyperbola, having given the diameter AB, the abscissa and double ordinate CE.

9. To describe the cycloid, epicycloid, hypocycloid.

10. To draw a circle which shall touch both lines of an angle and shall pass through a given point P.

II. ORTHOGRAPHIC PROJECTION.—PROFESSOR MORRIS.

SECOND YEAR.—SECOND TERM.

1. Give the plan and elevation of a line 2 inches long when it is inclined at 70 degrees to the horizontal and 45 degrees to the vertical plane.

2. Give plan and elevation of a square plane, 3 inches side, when one of its diagonals is at 45 degrees to the horizontal and 60 degrees to the vertical plane, the other diagonal being parallel to the horizontal plane.

3. Give plan and elevation of a cube, 2 inches side, when resting on one of its solid angles, one diagonal of the base being at 50 degrees to the horizontal and the other 90 degrees to the vertical plane.

4. Draw the plan and elevation of a cylinder 5 inches long and 2 inches in diameter, when the axis is inclined at 60 degrees to the horizontal and 45 degrees to the vertical plane.

5. A pipe of sheet iron, 2 inches diameter, is to be joined so as to turn an angle of 120 degrees. Show on an elevation the inclination of the line of section, and show on a development the line in which the metal must be cut to form the required parts.

6. A cylinder 2½ inches in diameter and 6 inches long, is penetrated by another 1½ inches in diameter and 5 inches long, their axes being at right angles to each other and intersecting at their centres. Show the mode of obtaining the curves of penetration and the development of the larger cylinder.

III. MECHANISM (WILLIS')—PROFESSOR MORRIS.

THIRD YEAR.—SECOND TERM.

1. Draw diagrams and explain the method of finding the velocity ratio in link-work. Give corollaries.

2. Bevel gearing.—The position of the axes being given and also the ratio of the angular velocities, describe the frustra of the cones; also find the angles at the vertices.

3. Teeth of wheels.—To find the smallest number of teeth or pins that can be employed when the pins have no sensible diameter.

4. Describe the odontograph and the method of using it.

5. To describe the teeth of wheels when their axes are not parallel. Example, bevel wheels.

6. In the communication of motion by sliding contact, directional relation changing, how may a varying velocity ratio be obtained?

7. Communication of motion by link-work. Problem: To determine the motion of a slide when the path of the end of the link travels in a line that does not meet the axis; what is the effect of changing the length of the link or connecting rod?

8. Trains of elementary combinations. Problem: Given the velocity ratio of the extreme axes or pieces of a train, to determine the number of intermediate axes and the proportions of the wheels or number of their teeth.

9. How may parallel motions be obtained?

10. Determinate changes—speed pulleys. Problem: Let there

be a set of six speed-pulleys, in each group of which the diameters of the extremes are thirteen inches and four inches, to find the intermediate diameters.

IV. STEAM-ENGINE.—PROFESSOR MORRIS.

THIRD YEAR.—THIRD TERM.

1. Describe the principal parts and appendages of boilers and furnaces.
2. State the difference between a high and a low pressure steam-engine.
3. Describe the principal parts and appendages of a high pressure steam-engine.
4. The same of a low pressure steam-engine.
5. State what you can of testing of boilers, explosions of boilers, incrustation, and care of boilers.
6. How are steam-engines classed?
7. What do you understand by a horse power?
8. How do you ascertain the nominal horse power of high pressure engines?
9. What effect is produced upon the crank pin of a locomotive by changing the length of the main rod, when the cross-head is at the centre of its travel?
10. Where is the crank pin when the piston is at the centre of its stroke, the main rod being four times the length of the stroke?
11. Describe the link-motion.
12. What do you understand by the terms "lead," "lap?"

V. MATERIALS EMPLOYED IN THE CONSTRUCTION.—PROFESSOR MORRIS.

FOURTH YEAR.—FIRST TERM.

1. Divisions of the subjects.
2. Conversion of ore into cast iron.
3. Manufacture of wrought iron.
4. Steel and its production.
5. Characteristics of cast iron, wrought iron and steel.
6. Describe tempering, annealing, case hardening.
7. Zinc, tin, lead, copper and their most useful alloys.
8. Other materials besides the metals used in construction.
9. Care and preservation of materials.

VI. DESIGNING OF MACHINERY.—PROFESSOR MORRIS.

FOURTH YEAR.—FIRST TERM.

Select from the following subjects; give complete and detail drawings, with specifications and probable cost.

1. Lathe.—Screw feed. Slide rest, back-geared; swing, 16 inch: bed, 9 ft.
2. Planing Machine.—To plane 22 inches wide, 20 inches high, cross and angular feed.
3. Crank planer with adjustable stroke from 16 inches down; planing 15 inches wide, 13 inches high.
4. Back-geared drill with self-feeding attachment. Traverse of table, 26 inches; of spindle, 12 inches; distance between table and spindle 34 inches; distance between base and spindle 44 inches.
5. Ten H. P. portable engine best suited to agricultural work.

VI. NATURAL HISTORY.

I. BOTANY.

I. SYSTEMATIC AND APPLIED BOTANY.—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—FIRST TERM.

1. Name the five principal groups into which plants are arranged in the natural system of classification.
2. State briefly the distinguishing characteristic of each of these groups.
3. What are plant characters?
4. From what parts of plants are characters of the highest importance derived?
5. Define species, genus, and order.
6. Name ten natural orders which can be easily distinguished by brief characters and state what these characters are.
7. Give a schedule of some species of Rosaceæ proper.
8. On what principle and by whom was the present arrangement of natural orders first adopted?
9. Why is it impossible to express the affinities of the natural orders in a linear arrangement?
10. Mention such indigenous Saxifragaceæ as you know to abound in the flora of Ithaca.
11. Name the cultivated Saxifragaceæ.
12. Name the six largest natural orders in regard to the number of species.
13. Give an account of the distribution of the species of the orders Magnoliaceæ, Leguminosæ, Compositæ and Gramineæ.
14. What are the six most important orders as furnishing food plants in temperate regions?
15. What six orders furnish the most important timber plants?
16. Name the orders which furnish the most extensively used medicines.
17. Name the four plants which furnish very extensively used beverages in different parts of the world, state the order to which each belongs, and give some account of its natural history.

18. The same of the four important sugar-producing plants.

19. Enumerate the products of Euphorbiaceæ, Urticaceæ, Solonaceæ, Chenopodiaceæ, Cruciferæ and Coniferæ, giving as far as possible the scientific names of the most important plants.

20. What orders form the natural group called Amentaceæ?

21. Characterize the sub-orders of Rosaceæ, Leguminosæ, and Compositæ.

22. How do Cyperaceæ differ from Gramineæ?

23. Into what groups can Gramineæ be conveniently arranged for purposes of study?

24. State what the following vegetable products are, and name the plants which produce them: camphor, ginger, alkanest, elaterium, aloes, gum arabic, manna, caoutchouc, gum lac, cinnamon, cloves, nutmeg, turpentine, opium, logwood, rattan, boxwood, asafœtida, croton oil, fustic, jute, saffron, tonka bean, jujube, vanilla.

25. Give some statistics of species, genera, and orders, and of indigenous and introduced plants.

II. VEGETABLE PHYSIOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Describe the vegetable cell and treat of its structure, different forms and physical properties.

2. Give a classification of the different contents of cells and name those of each class.

3. Define and describe the different kinds of plant tissue.

4. Name the fundamental plant organs.

5. What are homologous organs?

6. What is absorption? Give an account of the result of the latest researches concerning this function of plants.

7. What is transpiration? Show how the existence of this function may be demonstrated and the amount of transpiration measured.

8. Treat of plant respiration.

9. Give some account of circulation in plants, and of crude and elaborated sap.

10. Describe the process of assimilation, and name the conditions under which it takes place.

11. Give a classified table of the products of assimilation.

12. Write out an account of starch, describing its formation, structure, variation, and use in the economy of the plant.

13. Name the four elements of the organic constituents of plants, and explain their source in nature.

14. Treat of plant food.

15. How do fertile differ from poor soils in relation to plant growth?

16. Give diagrams of cross sections of exogenous, endogenous and cryptogamous stems, the first in full detail of structure.

17. Describe the medullary system of the exogenous stem in reference to the grain of cabinet and finishing woods.
18. What are the organs of fructification in the phænogamia?
19. Show that a flower is homologous with a branch.
20. Describe the process of fertilization in the phænogams.
21. What is the present state of knowledge in regard to the sexuality of cryptogams?
22. Describe the process of fertilization in Filices.
23. How do seeds differ from spores?
24. Describe briefly the methods instituted by nature for the distribution of the species of plants.

III. FUNGOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Draw a diagram of Æcidium Claytoniatum, and explain its structure.
2. State the specific differences of Æ. Claytoniatum and Æ. berberidis.
3. Explain the structure and supposed office of spermogonia.
4. What is meant by di-morphism?
5. Give an illustration from the false species Uredo rosæ.
6. What effect have parasitic fungi on the plant which nourishes them?
7. What is meant by alternate generation?
8. Illustrate this by a description of the change of forms in Uromyces appendiculatus.
9. Explain the structure of the conidia of Cystopus candidus.
10. Also the zoöspores of the same plant.
11. How is the parasitic fungus of any given crop transmitted to the succeeding crop?
12. Give the result of Doctor de Bary's experiment with the zoöspores of C. candidus.
13. Under what name is the immature wheat rust known?
14. What advantage to parasitic fungi is the production of different forms of fruit?
15. What remedies are available for rust in wheat?
16. Give a description of corn smut.
17. Also of the disease known as bunt.
18. Give some account of the potato rot fungus.
19. Also of the mildew of the grape vine.
20. What remedy is applicable to the latter disease?
21. What is the vinegar plant?
22. How do fungi induce fermentation?
23. What is known of the fungus which causes the disease called yellows?
24. Describe the fungus which causes the black-knot of plum and cherry.

25. How do fungi produce the decay in timber called dry-rot?
26. How may the attack of this fungus be prevented?
27. Draw a vertical section of Agaricus campestris, and name the parts.
28. How are edible distinguished from poisonous fungi?
29. State the characteristics of the six families of fungi.
30. Give a brief general description of fungi, as to their size, form and color.
31. Compare fungi with phænogamia as to their nutrition.
32. What are the uses of fungi?
33. Mention the diseases caused by fungi, in which prevention or remedy is practicable.
34. Also those in which no available remedy is known.
35. Mention the species of fungi which produce secondary forms of fruit on which false species have been founded.

2. ZOOLOGY.

I. ECONOMIC ENTOMOLOGY—INSTRUCTOR COMSTOCK.

1. Describe the articulate plan of structure.
2. Characterize the class *Insecta*.
3. Give tabular arrangement of the orders and suborders of the class *Insecta*.
4. Characterize the order *Hexapoda*.
5. Characterize the suborder *Lepidoptera*.
6. Explain the terms, larva, pupa, chrysalis, imago, incomplete metamorphoses and complete metamorphoses.
7. Give tabular arrangement of the typical mouth-parts of a true insect (*Hexapoda*).
8. What hymenopterous insects are social, and how do they differ from closely allied solitary forms?
9. Name two families of the *Hymenoptera* that are parasitic. Describe briefly their habits.
10. Characterize and give the habits of the *Sphingidae*; also *Aegeriadae*.
11. Describe the habits of the coddling-moth. Name remedies.
12. Describe the metamorphoses of the mosquitoes.
13. Describe the habits of the ground-beetles (*carabidae*), May-beetles (*Lachinosterna*), *Saperda Bivittata*, plant-lice, the snowy tree-cricket, ant-lion, aphis-lion and caddis-worms.

II. COMPARATIVE ANATOMY—PROFESSOR WILDER.

[*This is a special course for the students in the Natural History course and for others who choose to take it. It extends through the second and third terms. The subjects vary from year to year, the purpose being to give a complete account of a few forms or groups of animals, with discussion of their relative and bibliographical references*].

1. Enumerate the fishes of Cayuga lake.
2. Contrast the external and internal structure of the lamprey (*Petromyzon*). and the eel (*Anguilla.*)
3. Describe the development of *Petromyzon.*
4. Give diagrams (as transverse and longitudinal views) of the respiratory apparatus of *Amphioxus, Myxime, Bellostoma* and *Petromyzon.*
5. Give the external and internal characters of *Amia*, and name the teleostean genera to which it has some resemblance.
6. Compare the gar-pike (*Lepidostens*) with the sturgeon (*Accipenser.*)
7. Describe the brain of *Menobranchus*, and compare it with the brains of other Batrachians.

3. GEOLOGY.

I. ECONOMIC GEOLOGY—PROFESSOR COMSTOCK.

[*Select two questions from each set, except as noted.*]

1. Give series, class, division, family and sub-family of *syenite, syenitic granite, felstone, basalt, rhyolite, elvanite, quartz-porphyry, quartzite, dolomite, diorite* and *flint.*
2. Uses of term *trappean.* Differences of *granitic, trappean* and *volcanic* rocks.
3. Name and describe two aqueous, two igneous, and two metamorphic rocks.
4. Concise account of modes of origin of igneous, aqueous and metamorphic rocks.

5. Draw a single section illustrating *conformability, unconformability, three kinds of ridges* and *six forms of valleys.*
6. Illustrate five kinds of faults. Define "throw" of fault.
7. Illustrate by sections two advantages and two disadvantages in coal mining due to the occurrence of faults.
8. Give the so-called "rules of V."

9. Name the *native* metals in order of abundance and give the modes of occurrence of each in the pure state.
10. Geographical and geological distribution of gold.
11. Geological range of silver and its ores.
12. Give one prominent locality, with geological position, of each of the ores *cryolite, magnetite, hæmatite, galena.*
13. Occurrence of ores of *zinc, tin* and *lead.*

14. Occurrence of *copper* and its ores. Sources of mercury. *Chromic iron* in the United States.
15. Geological range of *peat, lignite, anthracite* and *bituminous coal.*
16. Name and define the principal coal fields of the world, stating character of product from each.

17. Prominent features of *cannel, free burning* and *caking* coal. Give locations of United States coal basins *not* of Carboniferous age.

18. Mode of occurrence and geological relations of *petroleum.*
19. Outline principal United States coal basins of Carboniferous age.
20. Causes of failure to obtain oil from wells sunk into the oil-bearing formation.
21. Most productive region in United States for gas wells. Source of the gas.

[*Here follow a number of sets relating to dyes, pigments, fictile materials, refractory substances, medicines, mineral waters, etc., after which are placed those given below.*]

[*Students of the courses in* SCIENCE *and* NATURAL HISTORY *will select two from this set.*]
46. Why should wells in drift deposits be avoided? Give structures suitable for artesian wells.
47. State clearly the general character of the products of economic importance which appertain to any one geological age.
48. Review briefly the economic products of any State of the Union.

[*Students of the* ENGINEERING COURSE *select two from this set.*]
49. Difference between *lake-formed* and *river-formed* sand-bars.
50. Explain use of *jetties* at river-mouths and elsewhere.
51. Compare *granites, felstones* and *greenstones* as road material. What should be avoided in choice of road gravels?
52. Quarrying in stratified and unstratified rocks, how differing? Placer mining, when practicable?

[*Two from this set to be chosen by students of the* COURSE IN ARCHITECTURE.]
53. Give geological age of the several rocks used in the University buildings. Where is each best developed in the United States, and what are the common defects for building purposes?
54. Relative architectural value of different species of granite.
55. Why is red sandstone often more durable than many kinds containing less iron?
56. Review the geological history and distribution of *marbles.*

II. GEOGNOSY AND PALÆONTOLOGY—PROFESSOR COMSTOCK AND MR. SIMONDS.

[*This list covers in a very general manner the course of work*

performed by under-graduates, some portion of which is required each term of all students in the laboratory.]

1. Classify as far as *genera*, the rocks and fossils placed before you. (Not less than forty specimens of each, without arrangement, and with labels concealed.)

2. Give the mineral ingredients of five rocks (selected by the examiner) and state all you can justly infer as to their genesis and subsequent history.

3. Illustrate by specimens (chosen by the student from the University collections) the differences in *granitic*, *trappean* and *volcanic* rocks.

4. Write an essay on the geognosy of the Chemung formation in the vicinity of Ithaca, based upon your own field notes.

5. Model in clay or wax a given local area, showing clearly the geological structure upon which the topography depends.

6. Point out the principal parts of one representative of each *Class* of fossils in your tray. (Specimens selected by the student from a number furnished by the examiner.)

7. Describe the fossil given you, after drawing it carefully, and show its biological and stratigraphical relations.

8. Write an essay on the life of the Hamilton Epoch, based upon your own field notes.

9. Collect the fossils from a given local block (say from a cubic yard of the Chemung formation) and prepare a report upon your observations in the field and laboratory.

III. PALÆONTOLOGY—INSTRUCTOR SIMONDS.

1. Give diagram, name and describe the different parts of a Trilobite.

2. Of what formations are the following species characteristic: *Lychas Boltoni, Phacops bufo, Dalmanites limulurus?*

3. Name the different families of *Brachiopoda*. (The student to select from a number of specimens representatives of each family.)

4. Name and describe the characteristic *Brachiopoda* of the Hamilton Group.

5. Tell all you know of the *Strophomenidæ*.

DEGREES AND PRIZES.

FOR 1875-6.

SEVENTH ANNUAL COMMENCEMENT.

THURSDAY, JUNE 15, 1876.

The Lord's Prayer.

1. ORATION: The Teutonic Element in Modern Civilization, STEPHEN PERRY STURGES, *Mansfield, Ohio.*
2. THESIS IN ARCHITECTURE: The Gothic Architecture of Italy, JOHN BERRY TARLETON, *Epsom, N. H.*
3. *PHILOSOPHICAL ESSAY: The Elements of Personal Power, FRANCIS LOONEY, *Buffalo.*
4. ESSAY IN CIVIL ENGINEERING: The Hydraulic Motor of the Cornell University, CHARLES BRACKETT WHEELOCK, *Austin, Texas.*
5. *ESSAY IN MECHANICAL ENGINEERING: Technical Education, FRANK EVERETT TAYLOR, *Hinsdale, N. H.*
6. ORATION: The Jew of Lessing and of Shakespeare, EDWARD AUGUSTINE WAGNER, *Pultney.*
7. ESSAY IN MECHANICAL ENGINEERING: Economy in the Mechanic Arts, EDWIN FAYETTE CHURCH, *Elmira.*
8. *THESIS IN PHYSICS: The Transmission of Volition and Sensation through the Nerves, MADISON MONROE GARVER, *Pecatonica, Ill.*
9. ORATION: Two Representative Orators of the American Revolution, CHARLES AMBROSE VAN VELZER, *Baldwinsville.*
10. *THESIS IN CIVIL ENGINEERING: The Railroad Bridge over the Chemung River at Elmira, N. Y., ALBERT ELIAS MALTBY, *Fayetteville.*
11. ORATION: Richelieu's Influence on Religious Toleration, WILLIS GAYLORD MCDOWELL, *Memphis.*
12. ORATION: Stoicism in the Roman Empire, CHARLES TEMPLE BREWER, *Cooperstown.*
13. *ESSAY IN ARCHITECTURE: English Architecture of the 19th Century, HERMAN BARKER SEELEY, *Ogdensburg.*

* Not read.

14. *THESIS IN CIVIL ENGINEERING: The Application of Heat to Vapor Motors,
WILLIAM FRANKLIN FARMER, *Pepperell, Mass.*
15. *THESIS IN GEOLOGY: The Physical Characteristics of Lake Owahgena, HENRY JOSEPH RICE, *Cazenovia.*
16. ORATION: Constellations in Art,
RACHEL LEEDOM MOORE, *Wilmington, Del.*
17. ORATION: The Limitations to Scientific Knowledge,
CHARLES BARTON COON, *Burdett.*
18. *THESIS IN CIVIL ENGINEERING: Bow String Bridges,
MORRIS ROBINSON CONABLE, *Cortland.*
19. *LITERARY ESSAY: The Dramatic Element of the Modern Novel, FRANK ELIJAH HEATH, *Pittsburg, Pa.*
20. THESIS IN CHEMISTRY: Review of some Proximate Analyses, WILLIAM KING ROY, *Wappinger's Falls.*
21. *THESIS IN BOTANY: The Marine Algæ of the Atlantic Coast, RIOKICHI YATABE, *Japan.*
22. THE WOODFORD ORATION: The Old and the New Prometheus, CLARENCE HOUGHTON ESTY, *Ithaca.*

Presentation of Prizes.

Conferring of Degrees and Certificates by the President.

BENEDICTION.

DEGREES CONFERRED IN 1876.

The following is a list of those who received degrees at the annual Commencement at the close of the seventh academic year, together with the degrees conferred and the residence of each recipient:—

FIRST DEGREES.

BACHELORS IN ARTS, (8).

WILLIAM JAMES BERRY,	Forestville.
SPENCER HOUGHTON COON,	New York city.
CLARENCE HOUGHTON ESTY,	Ithaca.
EUGENE FRAYER,	Carson, O.
WILLIS GAYLORD MCDOWELL,	Memphis.
HOWLAND RUSSEL,	Ithaca.
THEODORE STANTON,	Tenafly, N. J.
STEPHEN PERRY STURGES,	Mansfield, O.

BACHELOR OF LITERATURE, (1).

HARRIET CONVERSE TILDEN,	Chicago, Ill.

* Not read.

BACHELORS OF PHILOSOPHY, (3).

CHARLES TEMPLE BREWER,	Cooperstown.
FRED WILLIAM NOYES,	Dansville.
CHARLES EVERETT WASHBURNE,	Newton, Mass.

BACHELORS OF SCIENCE, (21).

JAMES MACERIEL ASHLEY,	Toledo, O.
CHARLES BARCLAY,	Longmont, Col.
CHARLES BARTON COON,	Burdett.
ELLA LUCY CRANDALL,	Ithaca.
SULA SPERRY EDDY,	Elmira.
DANIEL FRANKLIN FLANNERY,	Oil City, Pa.
FRANK ELIJAH HEATH,	Pittsburg, Pa.
FRANCIS LOONEY,	Buffalo.
RACHEL LEEDOM MOORE,	Wilmington, Del.
LELIA BELINDA PALMER,	Ithaca.
CLAYTON RAYMOND PARKHURST,	Scriba.
JAMES PARMELEE,	Youngstown, O.
HENRY HALE SEYMOUR,	Mt. Morris.
JAMES WARNER STURDEVANT,	Spartansburg, Pa.
WILL PERRY STURGES,	Mansfield, O.
HERBERT TERRY,	Fair Haven, Mass
CHARLES AMBROSE VAN VELZER,	Baldwinsville.
EDWARD AUGUSTINE WAGNER,	Pultney.
CHARLES PHILIP WOODRUFF,	Conesus Centre.
RIOKICHI YATABE,	Japan.
FRANK OLIVER YOUNG,	Blue Island, Ill.

IN CHEMISTRY AND PHYSICS, B. S.. (4).

MADISON MONROE GARVER,	Pecatonica, Ill.
WALTER HENRY KENT,	Ithaca.
WILLIAM KING ROY,	Wappinger's Falls.
HERMAN AUGUSTUS RUEPPELE,	St. Louis, Mo.

IN NATURAL HISTORY, B. S., (1).

HENRY JOSEPH RICE,	Cazenovia.

BACHELOR OF AGRICULTURE, (1).

CHARLES HENRY WILLMARTH,	Addison, Vt.

BACHELORS OF ARCHITECTURE, (6).

JEREMIAH KIERSTED CADY,	Indianapolis, Ind.
HERMANN MCCLURE HADLEY,	Brewer's Station.

WILLIAM HENRY PARKER,	Ogdensburg.
CHARLES FENNER SAUNDERS,	Westerly, R. I.
HERMAN BARKER SEELEY,	Ogdensburg.
JOHN BERRY TARLETON,	Epsom, N. H.

BACHELORS IN CIVIL ENGINEERING, (12).

CHARLES PETER AYLEN,	Aylmer, Canada.
CHARLES PAES DE BARROS,	Sorocaba, Brazil.
FRANCISCO DE ASSIS VIEIRA BUENO,	S. Paulo, Brazil.
MORRIS ROBINSON CONABLE,	Cortland.
ALFRED FRANCIS EIDLITZ,	New York City.
WILLIAM FRANKLIN FARMER,	Pepperell, Mass.
ALBERT ELIAS MALTBY,	Fayetteville.
JUSTUS CLARK MCMULLEN,	Unionville.
CHARLES WARD RAYMOND,	San Francisco, Cal.
JAMES HENRY STUBBS,	Framingham, Mass.
ELLIS DUNN THOMPSON,	Bound Brook, N. J.
CHARLES BRACKETT WHEELOCK,	Austin, Texas.

BACHELORS OF MECHANICAL ENGINEERING, (6).

GEORGE BOARDMAN,	Seneca Falls.
JAMES TAYLOR BROWN,	Wappinger's Falls.
CHARLES FRANCIS CARPENTER,	Utica.
EDWIN FAYETTE CHURCH,	Elmira.
ARTHUR ZENAS KENT,	Ithaca.
FRANK EVERETT TAYLOR,	Hinsdale, N. H.

SECOND DEGREES.

MASTERS OF ARTS, (4).

CHARLES HILDRETH BLAIR, A. B.
ALLA WRIGHT FOSTER, A. B., Vassar.
JULIA JOSEPHINE IRVINE, A. B.
CHARLES WHITTLESEY FOOTE, A. B., Western Reserve.

MASTERS OF SCIENCE, (2).

WILLIAM RUSSELL DUDLEY, B. S.
FREDERIC WILLIAM SIMONDS, B. S.

ARCHITECT, (1).

GEORGE BERRY, Arch. B.

ENGINEERS, (2).

FRANK CARPENTER, B. C. E.
CHARLES LEE CRANDALL, B. C. E.

DOCTOR OF VETERINARY MEDICINE, (1).

DANIEL ELMER SALMON, B. V. S.

CERTIFICATE IN JOURNALISM.

STEPHEN PERRY STURGES, A. B.

PRIZES AWARDED.

The following is a list of prizes awarded in the University during the seventh academic year—1875–6:—

1. Woodford Prize—a gold medal—C. H. Esty.
2. E. K. Rossiter Prize in architecture, thirty-five dollars, J. K. Cady.
3. First Prize Essay in the Cornell Review, twenty-five dollars, E. Schwerdtfeger.
4. Second Essay in the Cornell Review, S. H. Coon.
5. First Prize for Excellence in Reading, twenty dollars, H. H. Cobb.
6. Second Prize for Excellence in Reading, ten dollars, J. H. Wienman.
7. Prize of the Early English text society, valuable books, J. D. Pitts.
8. Prize of the New Shakespeare Society, valuable books, S. H. Coon.
9. First President's Prize in Literature, fifteen dollars, S. H. Coon.
10. Second President's Prize in Literature, fifteen dollars, G. W. Gillett.
11. Third President's Prize in Literature, fifteen dollars, N. A. Randolph.
12. First Horace K. White Prize in Veterinary Science, twenty dollars, H. L. Stevens.
13. Second Horace K. White Prize in Veterinary Science, ten dollars, B. H. Grove.

PRIZES FOR UNDERGRADUATES.

The following prizes are offered for the year 1876–7.

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a com-

petitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford Prize the present year are as follows:

1. The Self-control of the American People.
2. The Moslem in Europe.
3. The Alleged Decline of Reverence.
4. Phocion and Demosthenes.
5. The Moral Type constituting the Ideal in different ages.
6. Civil Service Reform.
7. The "Personal Equation" in Social, Moral and Political Estimates.
8. Organic and Critical Periods of History.
9. The New England Township.
10. "The Sun never Sets."
11. Individual Genius in Conflict with National Strength.
12. The speeches of Brutus and Antony in Shakespeare.

The orations are to be handed in to the Professor of Rhetoric on or before the last Monday in March.

ROSSITER PRIZE IN ARCHITECTURE.

A sum of Thirty Dollars is offered by Ehrick K. Rossiter, a graduate of 1875 in this department, for the best design by any member of the Senior class in Architecture, the successful competitor to leave his design for exhibition on the walls of the draughting-room.

THE HORACE WHITE PRIZE.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars;* to the second in merit, *Ten Dollars.*

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

ARTICLE I.

1. There shall be two standing committees, an executive committee and an auditing committee.

2. The executive committee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

4. The order of business at each regular meeting shall be as follows:—

(*a*) The secretary shall ascertain the names of the members present by roll call or otherwise.

(*b*) Reading the minutes of the last meeting.

(*c*) Treasurer's report and the referring of it to the auditing committee.

(*d*) Report of the executive committee.

(*e*) Reports of special committees.

(*f*) Miscellaneous business.

(*g*) Election of officers and committees.

(*h*) Election of Trustee or Trustees.

(*i*) Adjournment.

ARTICLE 2.

1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not herein before provided for, shall be elected as follows: The president by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of New York, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1876-7.

President—J. M. CHASE, '72.
Vice-Presidents—C. F. HENDRYX, '69; S. D. HALLIDAY, '70; G. A. BENTON, '71; W. HARKINS, '72; G. B. TURNER, '73; C. A. PRESTON, '74; C. F. BURT, '75.
Recording Secretary and Treasurer—G. W. HARRIS.
Corresponding Secretary—R. G. H. SPEED.
Executive Committee—W. R. LAZENBY; P. H. PERKINS; S. SMITH. R. G. H. SPEED; G. W. HARRIS.
Auditing Committee—H. V. L. JONES; T. SANDERSON; H. L. SPRAGUE.
Orator—J. E. MORE.
Alternate—S. SMITH.
Poet—W. R. DUDLEY.
Alternate—D. S. JORDAN.

TRUSTEE ELECTED.

H. B. LORD.

MEMBERS OF THE ASSOCIATION.

GRADUATED IN 1869. [8]

* The star denotes deceased graduates.

G. F. Behringer, A. B.
M. B. Buchwalter, A. B.
J. B. Foraker, A. B.
C. F. Hendryx, A. B.
J. Kirkland, A. B.
J. A. Rea, A. B.
D. W. Rhoades, A. B.
O. F. Williams, A. B.

GRADUATED IN 1870. [24]

A. A. Andrews, B. S.
S. S. Avery, B. S.
J. S. Butler, B. S.
J. J. Chambers, Ph. B.
T. B. Comstock, B. S.
B. V. B. Dixon, A. B.
E. Douglas, A. B.
H. T. Eddy, C. E., (Ph.D., '72).
A. R. Greene, A. B.
S. D. Halliday, A. B.
E. D. Jackson, Ph. B.
H. V. L. Jones, Ph. B.
G. H. Lothrop, Ph. B.
G. M. Luther, B. S.
J. L. Maxwell, Ph. B.
P. Mosher, A. B,
C. J. Powers, B. S.
C. L. Powers, B. S.
E. F. Robb, A. B.
M. M. Ross, B. S.
P. G. Schoeder, Ph. B.
T. W. Spence, A. B.
C. A. Storke, A. B.
F. Walters, Ph. B.

GRADUATED IN 1871. [40]

W. S. Barnard, B. S.
L. H. Barnum, Ph. B.
G. A. Benton, A. B.
P. C. J. De Angelis, A. B.
A. B. Doerflinger, B. C. E.

A. H. Edgren, Ph. B.
W. Farnham, B.C. E., (C. E.,'74).
A. N. Fitch, Ph. B.
O. Gillett, B. C. E.
E. J. Hadley, B. S.
W. H. Hayes, B. S.
I. Hoagland, B. S., (Ph. B., '72).
S. F. Huntley, B. S.
K. W. Ingham, Ph. B.
G. W. Ingraham, A. B.
M. Kasson, B. V. S.
R. O. Kellogg, Ph. B.
E. D. Leffingwell, B. S.
J. J. Lockhart, B. S.
J. M. McNair, B. S.
W. S. McGregor, B. S.
J. E. More, A. B.
M. J. Morse, Ph. B.
J. O'Neill, A. B.
E. L. Parker, A. B.
C. E. Reeves, B. S.
F. H. Remington, B. S.
A. J. Rogers, Ph. B.
W. P. Ryman, B. S.
S. W. Salmon, B. C. E.
F. Schoff, B. C. E.
A. H. Sewell, B. S.
F. Sherman, B. S.
G.L.T.Smith, B.C.E., (C.E.,'74).
M. A. Smith, B. C. E.
R. G. H. Speed, Ph. B.
R. Taft, B. S.
W. H. Tallmadge, A. B.
C. E. Van Cleef, B. S.
W. DeL. Wilson, A. B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph. B.
M. C. Bean, B. C. E.
C. H. Blair, A. B. (A.M.,'76).
D. W. Bowman, B. C. E.
E. L. Brady, B. S.
G. F. Breed, Ph. B.
H. S. Buffum, B. S.
J. M. Chase, B. S.
I. E. Clark, B. C. E.
A. C. Clement, B. S.
A. W. Clinton, B. S.
D. Colburn, B. C. E.
M. T. Conklin, B. S.
H.E.Copeland, Ph.B.,(M.S., '75).
C. L. Crandall,(C.E.,'76).
C. S. Crofoot, Ph. B.
Gram Curtis, B. C. E.
D. M. Darrin, B. S.
L. A. Foster, B. S.
F. W. Frost, B. C. E.
A. N. Fuller, B. S.
W. Harkins, B. S., (B. Lit., '73)
R. Headley, B. S.
H. C. Henderson, B. C. E.
I. N. L. Heroy, B. S.
W. E. Holcomb, B. S.
F. Holden, A. B.
R. B. Howland, B. C. E.
J. H. Hurd, B. S.
E. W. Hyde, B. C. E., (C. E.,'74).
G. A. Iselin, B. S.
D. S. Jordan, M. S.
L. F. Judson, B. S.
M. Kellogg, B. S.
J. B. Lawrence, Ph. B.
W. N. B. Lawton, Ph. B.
W. B. Leach, B. S.
J. W. Mack, B. S.
J. T. McCollum, B. S.
T. J. McConnon, B. S.
E. E. McElroy, B. S.
F. D. Nash, B. S.
E. Nicoll, B. S.
W. H. Niles, B. S.
A. Osborn, A. B.
D. M. Page, B. S.
M. G. Peters, B. S.
A. C. Pike, B. S.
G. W. Pitts, B. S.
H. G. Pollock, B. S.
C. S. Price, B. C. E.
A. L. Rader, Ph. B.
A. Rogers, B. C. E.
D. E. Salmon, (D.V.M., '76).
T. Sanderson, A. B.
W. I. Scott, B. S.
G. P. Serviss, B. S.
C. B. Sill, B. C. E.
C. Smith, B. S.
L. P. Smith, B. S., (Ag. B., '74)

M. G. Stolp, B. C. E.
S. P. Thomas, B. C. E.
J. E. Van De Carr, B. S.
J. DeW. Warner, Ph. B.
A. C. Weeks, B. S.
S. N. Williams, B. C. E.
E. V. Wilson, B. S.
T. H. Wolford, B. S.
W. J. Youngs, B. S.

GRADUATED IN 1873. [95]

C. F. Allen, B. C. E.
H. Altman, B. S.
R. Anderson, B. M. E.
J. C. Averill, B. S.
A. B. Aubert, B. S.
R. Bacon, B. S.
E. Bartley, B. S.
S. F. Belknap, B. S.
H. E. Blake, B. C. E.
L. G. Boies, A. B.
I. W. Boothby, B. S.
S. W. Brown, B. S. (C.E.,'76).
Frank Carpenter, B. C. E.
F. H. Carver, B. S.
A. B. Cauldwell, B. S.
J. Chamberlin, B. S.
J. P. Church, B. C. E.
J. T. Cothran, A. B.
W. H. Denham, B. S.
O. A. Derby, B. S., (M. S., '74).
Geo. Devin, B. C. E.
*E.T.Diefendorff, B. S.
E. G. Donaldson, B. Lit.
G. F. Dudley, B. S.
W. F. Duncan, B. S.
E. S. Eastman, Ph. B.
L. Elsbree, A. B.
L. Everett, B. S.
J. B. Ewell, B. S.
L. S. Falkeneau, B. C. E.
F. B. Ferriss, B. S.
P. D. Finnegan, A. B.
C. Finster, A. B.
N. K. Foster, B. S.
J. Frankenheimer, Ph. B.
M. R. Frazer, A. B.
A. Gridley, B. S.
F. N. Hagar, A. B.
F. W. Halsey, B. S.
G. W. Harris, Ph. B.
A. C. Harwick, B. S.
J. W. Hill, B. M. E.
G. W. Horner, B. C. E.
E. M. Howard, B. S.
A. T. Hyde, B. C. E.
H. C. Johnson, A. B.
*F. H. Jones, B. Lit.
C. S. Joy, A. B.
F. W. Kelley, A. B., (Ph.D., '74).
W. L. Klein, B. S.
F. J. Knight, B. C. E.
J. M. Knowles, B. S.
D. E. Kohler, A. B.
C. Y. Lacy, Agr. B.
C. F. Lane, A. B.
D. T. Lawson, B. C. E.
W. Leland, B. S.
C. E. Lipe, B. M. E.
R. H. Lockwood, B. C. E.
G. F. Lyman, B. C. E.
D. W. J. Mesick, B. S.
J. L. Moffatt, B. S.
J. G. Moore, A. B.
G. C. Morehouse, B. S.
W. T. Morris, B. S.
J. G. Newkirk, A. B.
C. D. Page, B. S.
R. Parmely, B. S.
F. Parson, B. C. E.
G. E. Patrick, B. S., (M. S., '74).
G. H. Phelps, B. S.
A. H. Phinney, (B. S.,) Ph. D.
*K.Preston, B. C. E.
F. W. Proctor, B. S.
F. J. Root, B. C. E.
J. R. Schoonover, Arch. B.
E. H. Scofield, A. B.
J. F. Seybolt, B. S.
M. C. Sharp, Ph. B.
M. A. Shotwell, Ph. B.
C. D. W. Smith, B.S., (M.S., '75).
C. L. Smith, B. S.
S. Smith, B. S.
W. H. Smith, A. B.
H. L. Sprague, B. S.
W. L. Sprague, A. B.

H. D. Stevens, B. S.
G. A. Tilley, B. C. E.
W. Tinning, B. S.
J. H. Tompkins, B. C. E.
G. B. Turner, B. S.
M. W. Van Auken, A. B.
C. F. Wheelock, B. S.
T. S. White, B. C. E.
T. Worthington, Ph. B.

GRADUATED IN 1874. [64].

F. B. Alexander, B. C. E.
Geo. Berry, Arch. B. (Arch.,'76)
N. W. Cady, Ph. B.
C. W. Candee, B. S.
J. D. Case, B. S.
J. F. Cluck, A. B.
J. H. Comstock, B. S.
F. W. Cooper, Arch. B.
O. H. P. Cornell, C. E.
J. A. Dobroluboff, B. C. E.
W. R. Dudley, B. S. (M.S.,'76)
H. L. R. Fairchild, B. S.
W. R. Fitch, B. C. E.
S. P. Fleming, A. B.
W. H. Flint, A. B.
R. B. Foster, B. C. E.
L. M. Fulton, B. S.
Wallace Green, B. C. E.
H. M. Gillett, B. S.
T. Hampson, Lit. B.
J. T. Hay, B. S.
B. A. Hayes, Lit. B.
L. T. Henderson, Ph. B.
H. M. Hibbard, B. C. E.
H. L. House, A. B.
J. T. Hurd, B. S.
W. H. Janney, B. C. E.
E. F. P. Jordao, B. C. E.
W. A. Kellerman, B. S.
H. M. Kennedy, Lit. B.
B. W. Law, Arch. B.
C. H. Lay, B. C. E.
W. R. Lazenby, Agr. B.
H. G. Northrup, B. C. E.
J. H. Pierce, B. S.
E. M. Pitts, B. S., (M. S., '75).
C. A. Preston, B. S.
C. H. Ramsay, B. S.
E. O. Randall, Ph. B.
W. M. J. Rice, Arch. B.
H. B. Robinson, B. C. E.
B. E. Shear, Arch. B.
G. S. Sheppard, B. S.
W. M. Smith, B. S.
W. N. Smith, B. M. E.
C. W. Soulby, B. S.
J. H. Southard, B. S.
A. C. Standart, B. S.
J. L. Stone, Agr. B.
W. Swaty, B. S.
W. P. Thompson, B. S.
L. P. Tier, B. C. E.
S. E. Todd, Arch. B.
F. C. Tomlinson, B. C. E.
G. B. Upham, B. S.
J. D. Upham, B. S.
M. Van Cleef, B. S.
G. R. Van De Water, B. S.
C. W. Wasson, B. C. E.
F. W. Warthorst, B. C. E.
R. H. Wiles, B. S.
G. T. Winston, Lit. B.
C. C. Wood, B. S.
F. C. Wood, B. S.

GRADUATED IN 1875. [52].

W. O. Bates, Ph. B.
A. A. Beattie, B. M. E.
H. P. Bellows, B. S.
E. T. Betts, B. S.
A. R. Bradford, B. S.
A. W. Bulkley, Arch. B.
S. J. Bunting, B. M. E.
C. F. Burt, B. S.
S. W. Carpenter, Ph. B.
I. N. Cook, B. C. E.
E. Corson, B. S.
V. L. Davey, A. B.
J. W. Dean, B. S.
O. W. Ferguson, B. C. E.
G. H. Fitch, B. S.
E. L. B. Gardiner, B. M. E.
E. George, B. C. E.
A. R. Gillis, B. M. E.
A. C. Green, B. C. E.

C. S. Harmon, B. S.
O. Harris, B. S.
F. Hatch, A. B.
F. H. Hiscock, A. B.
D. R. Horton, B. S.
I. E. Hutton, Arch. B.
E. Jackson, B. S.
C. C. King, Arch. B.
H. B. Knight, A. B.
M. H. Ladd, A. B.
M. D. Makepeace, B. C. E.
G. S. Moler, B. M. E.
J. T. Newman, Ph. B.
E. L. Nichols, B. S.
P. H. Perkins, B. C. E.
E. D. Preston, B. C. E.
E. J. Preston, B. S.
H. H. Roberts, Ph. B.
E. K. Rossiter, Arch. B.
H. W. Sackett, A. B.
A. F. Shaw, B. S.
F. W. Simonds, B. S. (M. S., '76).
F. P. Smith, B. S.
F. P. Stevens, B. S.
W. M. Sturges, Agr. B.
G. Tatnall, B. C. E.
J. J. Thomas, A. B. (A. M., '76).
G. R. Thompson, B. S.
W. J. Thompson, B. S.
D. J. Tomkins, Ph. B.
V. S. Walsh, B. S.
F. P. Wheeler, B. S.
J. Worthington, A. B.

GRADUATED IN 1876. [65]

J. M. Ashley, B. S.
C. P. Aylen, B. C. E.
C. Barclay, B. S.
Carlos P. de Barros, B. C. E.
W. J. Berry, A. B.
G. Boardman, B. M. E.
C. T. Brewer, Ph. B.
J. T. Brown, B. M. E.
F. de A. V. Bueno, B. C. E.
J. K. Cady, Arch. B.
C. F. Carpenter, B. M. E.
E. F. Church, B. M. E.
M. R. Conable, B. C. E.
C. B. Coon, B. S.
S. H. Coon, A. B.
E. L. Crandall, B. S.
S. S. Eddy, B. S.
A. F. Eidlitz, B. C. E.
C. H. Esty, A. B.
W. F. Farmer, B. C. E.
D. F. Flannery, B. S.
C. W. Foote, (A. B.) M. A.
A. W. Foster, (A. B.) M. A,
E. Frayer, A. B.
M. M. Garver, B. S.
H. McC. Hadley, Arch. B.
F. E. Heath, B. S.
A. Z. Kent, B. M. E.
W. H. Kent, B. S.
F. Looney, B. S.
A. E. Maltby, B. C. E.
W. G. McDowell, A. B.
J. C. McMullen, B. C. E.
R. L. Moore, B. S.
F. W. Noyes, Ph. B.
L. B. Palmer, B. S.
W. H. Parker, Arch. B.
C. R. Parkhurst, B. S.
J. Parmelee, B. S.
C. W. Raymond, B. C. E.
H. J. Rice, B. S.
W. K. Roy, B. S.
H. A. Rueppele, B. S.
H. Russel, A. B.
C. F. Saunders, Arch. B.
H. B. Seeley, Arch. B.
H. H. Seymour, B. S.
T. Stanton, A. B.
J. H. Stubbs, B. C. E.
J. W. Sturdevant, B. S.
S. P. Sturges, A. B.
W. P. Sturges, B. S.
J. B. Tarleton, Arch. B.
F. E. Taylor, B. M. E.
H. Terry, B. S.
E. D. Thompson, B. C. E.
H. C. Tilden, Lit. B.
C. A. Van Velzer, B. S.
E. A. Wagner, B. S.
C. E. Washburne, Ph. B.
C. B. Wheelock, B. C. E.
C. H. Willmarth, Agr. B.
C. P. Woodruff, B. S.
R. Yatabe, B. S.
F. O. Young, B. S.

PREPARATORY SCHOOL.

The Calendar of the **Preparatory School** *conducted by Professors* MACKOON *and* WAIT *is the same as that of the Cornell University, with one term additional beginning in June, on the Wednesday following the annual Commencement of the University.*

Thorough instruction is given, to classes, or to single pupils, in the studies of any of the preparatory courses, and in the Languages and Mathematics required in any of the departments of the University. Inquiries may be addressed to either of the undersigned, Ithaca, N. Y.

B. P. MACKOON. L. A. WAIT.

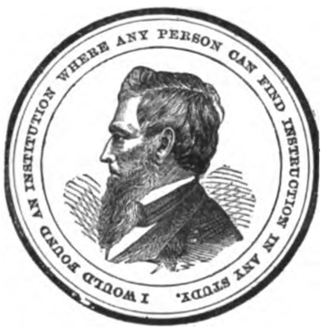
THE

CORNELL

UNIVERSITY REGISTER

AND CATALOGUE

1877-78



ITHACA

PUBLISHED BY THE UNIVERSITY

1876

CONTENTS.

THE CALENDAR.

1877	Sept. 18	Fall Term.
September 18	Tuesday	Entrance Examinations.
September 19	Wednesday	Entrance Examinations continued.
September 20	Thursday	REGISTRATION for the Term.
September 21	Friday	Instruction begins.
November	Thursday and Friday	THANKSGIVING.
December 17	Monday	Term Examinations begin.
December 21	Friday	Term ends.
1878	**Jan. 8**	**Winter Term.**
January 8	Tuesday	Entrance Examinations.
January 9	Wednesday	Entrance Examinations continued.
January 10	Thursday	REGISTRATION for the Term.
January 11	Friday	Instruction begins.
January 11	Friday	FOUNDER'S DAY,
February 22	Friday	WASHINGTON'S BIRTHDAY.
March 25	Monday	Term Examinations begin.
March 29	Friday	Term ends.

1878		Apr. 6	Spring Term.
April	6	Saturday	REGISTRATION for the Term.
April	8	Monday	Instruction begins.
May	3	Friday	Woodford Prize Competition.
May	20	Monday	Commencement Essays handed in.
May	30	Thursday	DECORATION DAY.
June	3	Monday	Senior Examinations begin.
June	4	Tuesday	Examinations for Second Degrees.
June	10	Monday	Term Examinations begin.
June	15	Saturday	Term Examinations end.
June	17	Monday	Entrance Examinations begin.
June	18	Tuesday	Class Day. Annual Meeting of the Trustees.
June	19	Wednesday	Alumni Day.
June	20	Thursday	ANNUAL COMMENCEMENT.
1878		**Sept. 17**	**Fall Term.**
September	17	Tuesday	Entrance Examinations.
September	18	Wednesday	Entrance Examinations continued.
September	19	Thursday	REGISTRATION for the Term.
September	20	Friday	Instruction begins.

OFFICERS OF THE UNIVERSITY.

BOARD OF TRUSTEES.

Annual Meeting of the Board on the Tuesday before Commencement, 10 a. m.

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J. W. WILLIAMS, Treasurer,
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LIBRARIAN, *Professor of North European Languages.*

GEORGE C. CALDWELL, B.S., PH.D., 148 E. Buffalo St.
Professor of Agricultural and Analytical Chemistry.
Secretary of the Faculty.

BURT G. WILDER, B.S., M.D., 58 Cascadilla.
Professor of Comparative Anatomy and Zoology.

GOLDWIN SMITH, LL.D., L.H.D., Toronto, Canada.
Lecturer on English and Constitutional History.

JAMES LAW, F.R.V.C., University Hill.
Professor of Veterinary Medicine and Surgery.

CHARLES FRED HARTT, M.A., [Absent in Brazil.]
Professor of General, Economic and Agricultural Geology.

ALBERT N. PRENTISS, M.S., 116 Cascadilla.
Professor of Botany, Horticulture and Arboriculture.

NOTE.—Arranged, with the exception of the officers of the Faculty, in the order of seniority of appointment.

JOHN L. MORRIS, M.A., C.E., University Avenue.
SIBLEY *Professor of Mechanical Engineering and Machine Construction.*

T. FREDERICK CRANE, M.A., University Avenue.
Professor of Spanish and Italian and Assistant Professor of French.

ZIBA HAZARD POTTER, M.A., M.D., LL.B., 137 Cascadilla.
Assistant Professor of Mathematics.

CHARLES A. SCHAEFFER, M.A., PH.D., 103 E. Seneca.
Professor of General and Analytical Chemistry, and Mineralogy.

BAYARD TAYLOR, M.A., Kennet Square, Pa.
Non-Resident Professor of German Literature.

FREDERICK L. O. RŒHRIG, PH.D., M.D., Pughtown Road.
Professor of Sanscrit and Living Asiatic Languages, and Assistant Professor of French.

HIRAM CORSON, M.A., University Hill.
Professor of Anglo-Saxon and English Literature.

WATERMAN T. HEWETT, M.A., [Absent in Europe.]
Assistant Professor of German.

BELA P. MACKOON, M.A., 93 E. Buffalo St.
Professor of German.

CHARLES H. WING, B.S., Jamaica Plain, Mass.
Non-Resident Professor of Organic Chemistry.

ALFRED STEBBINS, M.A., 110 N. Aurora.
Assistant Professor of South European Languages.

LUCIEN A. WAIT, B.A., Dryden Road.
Associate Professor of Mathematics.

TRACY PECK, M.A., Eddy St.
Professor of the Latin Language and Literature.

ISAAC FLAGG, PH.D., Pughtown Road.
Professor of the Greek Language and Literature.

CHARLES CHAUNCY SHACKFORD, M.A., University Avenue.
Professor of Rhetoric and General Literature.

REV. CHARLES BABCOCK, M.A., University Grounds.
Professor of Architecture.

JAMES EDWARD OLIVER, M.A., Heustis St.
Professor of Mathematics.

WILLIAM A. ANTHONY, PH.B., Heustis St.
Professor of Physics and Experimental Mechanics.

JOHN E. SWEET, 148 Cascadilla.
Master Mechanic and Director of the Machine Shop in the Sibley College.

HJALMAR HJORTH BOYESEN, PH.D., 120 Cascadilla.
Professor of German Literature and Assistant Professor of North European Languages.

ESTEVAN A. FUERTES, PH.B., C.E., State St.
Professor of Civil Engineering.

EDWIN C. CLEAVES, B.S., Cortland.
Assistant Professor of Free-hand Drawing and of Mechanical Draughting.

ISAAC P. ROBERTS, University Farm.
Professor of Agriculture.

ABRAM A. BRENEMAN, B.S., 126 Cascadilla.
Assistant Professor of Analytical Chemistry and Lecturer on Industrial Chemistry.

THEODORE B. COMSTOCK, B.S., 144 Cascadilla.
Assistant Professor of General and Economic Geology.

CHARLES LEE CRANDALL, C.E., West Hill.
Assistant Professor of Engineering.

IRVING P. CHURCH, B.C.E., 105 Cascadilla.
Assistant Professor of Engineering.

HORATIO S. WHITE, B.A., University Avenue.
Assistant Professor of Greek and Latin.

J. HENRY COMSTOCK, B.S., South University.
Assistant Professor of Entomology, and Lecturer on the Zoology of Invertebrates.

WILLIAM R. DUDLEY, M.S., Dryden Road.
Assistant Professor of Botany.

JAMES B. BURBANK, Brevet Major 3d Artillery, U.S.A. Quarry St.
Professor of Military Science and Tactics.

GEORGE WILLIAM JONES, A.M., Heustis St.
Assistant Professor of Mathematics.

OTHER UNIVERSITY OFFICERS.

JOHN S. COON, B.M.E.,
Instructor in Mechanic Arts in the Sibley College.

EDWARD P. JENNINGS, C.E.,
Instructor in Chemistry.

WALTER H. KENT, B.S.,
Instructor in Chemistry.

WILLIAM R. LAZENBY, AG.B.,
Instructor in Horticulture and Superintendent of the Botanical and General Garden.

WILLIAM E. LUCAS, PH.B.,
Instructor in Rhetoric and Composition.

GEORGE S. MOLER, B.M.E.,
Instructor in Physics.

B. HERMON SMITH,
Director of the University Press and Instructor in Typography.

FRANK A. WRIGHT,
Instructor in Architectural Drawing.

GEORGE W. HARRIS, PH.B.,
Assistant Librarian.

CHARLES P. WOODRUFF, B.S.,
Assistant in the Library.

CHARLES B. MANDEVILLE, B.S.,
Janitor.

F. M. KENDALL,
H. W. SNYDER,
Masters of the Chimes.

SPECIAL FACULTIES.

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ARCHITECTURE—The PRESIDENT, Professor BABCOCK *Dean*, Professors FUERTES, OLIVER, and CLEAVES.

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MATHEMATICS—The PRESIDENT, Professor OLIVER *Dean*, Professors ANTHONY, BABCOCK, FUERTES, JONES, MORRIS, POTTER, and WAIT.

THE SIBLEY COLLEGE OF MECHANIC ARTS—The PRESIDENT, Professor MORRIS *Dean*, Professors ANTHONY, BABCOCK, FUERTES, OLIVER, SWEET, and CLEAVES.

MILITARY SCIENCE AND TACTICS—The PRESIDENT, Professors BURBANK, WILSON, and POTTER.

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PHILOSOPHY AND LETTERS—The PRESIDENT, Professor SHACKFORD *Dean*, Professors CORSON, WILSON, and BAYARD TAYLOR.

CATALOGUE OF STUDENTS.

RESIDENT GRADUATES.

CRIM, FRANK DWIGHT, B.S., Cornell, Mohawk.
Natural History and Chemistry.

DENNIS, WALDO E., B.S., Cornell, Amanda, O.
Natural History.

FARRINGTON, ARTHUR MANLEY, B.S., Maine State, Orono, Me.
Agriculture.

FOLLETT, ALFRED DEWEY, A.B., Marietta, Marietta, O.
History and Political Science.

GAGE, SIMON HENRY, B.S., Cornell, Worcester.
Natural History.

GENTLEMAN, W., B.S., Cornell, Ottawa, Ill.
History and Political Science.

HASKELL, NEWELL PRINCE, B.S., Maine State, New Gloucester, Me.
Chemistry and Physics.

HINE, FRANK BROOKS, B.S., Cornell, Edon, O.
Natural History.

HOWARD, LELAND OSSIAN, B.S., Cornell, Ithaca.
Natural History.

JORDAN, WHITMAN HOWARD, B.S., Maine State, New Gloucester, Me.
Chemistry and Physics.

LUCAS, WILLIAM EDWARD, Ph.B., Cornell, Groves, Ind.
Chemistry and Natural History.

MANDEVILLE, CHARLES BAKER, B.S., Cornell, Elida, Ill.
History and Political Science.

MEAD, THEODORE LUQUEER, B.C.E., Cornell, New York City.
Natural History.

MILFORD, JAMES S., B.S., Cornell, New York City.
History and Political Science.

OSMOND, ISAAC THORNTON, A.B., Mt. Union, Ithaca.
Physics and Mathematics.

SAUNDERS, CHARLES FENNER, Arch.B., Cornell, Westerly, R. I.
History and Political Science.

SHERMAN, BELLE, B.S., Lombard, Camden, N. J.
Natural History and Chemistry.

THOMPSON, LILLIA B., B.S., Whittier, Mt. Pleasant, Iowa.
History and Literature.

WILLMARTH, CHARLES HENRY, M.S., Cornell, Addison, Vt.
History and Political Science.

WILSON, CHARLES FORSYTH, Ph.B., Cornell, Ithaca.
History and Literature.

WOOD, THOMAS D., Ph. B., Western University of Pa. Pittsburgh, Pa.
Mechanic Arts.

UNDERGRADUATES.

IN THE FOURTH YEAR OR SENIOR STUDIES.

Ames, Charles Wilberforce,	Germantown, Pa.,	*Literature*
Babcock, John Wesley,	Jamestown,	*Arts*
Baker, Eugene,	Ithaca,	*Science and Letters*
Ballard, Alfred Hovey,	Syracuse,	*Science and Letters*
Ballard, Samuel Thruston,	Louisville, Ky.,	*Science and Letters*
Barnard, Philip,	Lake View, Ill.,	*Science and Lettters*
Beahan, Willard,	Watkins,	*Engineering*
Beardsley, Arthur Eugene,	Cayuga, Ill.,	*Natural History*
Bissell, Frank Edward,	South Bend, Ind.,	*Engineering*
Blowers, Clarence Newman,	Syracuse,	*Optional*
Borden, James McKee,	Washington, D. C.,	*Mechanic Arts*

Breed, William Bradley,	Phoenix,	*Chem. and Physics*
Bruen, Frank,	Dayton, O.,	*Engineering*
Burdsall, Ellwood,	Port Chester,	*Mechanic Arts*
Cady, Daniel Wayland,	Peterborough,	*Arts*
Cary, Eugene,	Dunkirk,	*Science and Letters*
Cole, Willoughby,	San Francisco, Cal.,	*Optional*
Conant, Heywood,	Wilmington, Del.,	*Science and Letters*
Crandall, Clayton,	Ithaca,	*Chem. and Physics*
De Witt, Bessie Bell,	Owego,	*Arts*
Dyson, James,	New Britain, Ct.,	*Engineering*
Eaton, George Penston,	Oxford,	*Science and Letters*
Everson, Charles Brown,	Syracuse,	*Science and Letters*
Falkeneau, Arthur,	New York City,	*Mechanic Arts*
Gottheil, William Samuel,	New York City,	*Natural History, Opt.*
Green, Edward,	Utica,	*Architecture*
Halsey, Frederic Arthur,	Unadilla,	*Mechanic Arts*
Heermans, Forbes,	Syracuse,	*Mechanic Arts*
Hill, John Thomas,	Warren, Pa.,	*Mechanic Arts*
Jarvis, George Milton,	Canastota,	*Engineering*
Johnson, Ben,	Ithaca,	*Mechanic Arts*
Jones, Lisette Frances,	Ilion,	*Science and Letters*
Kasson, Myron Cassius,	Woodstock, Ill.,	*Agriculture*
Keith, William,	Warsaw,	*Chem. and Physics*
Kendall, Franklin Mason,	Attica,	*Science and Letters*
Lehmaier, Jacob Schwartz,	New York City	*Philosophy*
Lewis, John,	Ithaca	*Mechanic Arts*
Mann, Frank Weston,	Norfolk, Mass.	*Science*
Marx, David,	Toledo, O.,	*Engineering*
Maxwell, Frank Adams,	Clymer,	*Engineering*
McCormick, Cyrus Hall,	Henderson, Ky.,	*Engineering*
McEbright, Kit,	Millersburg, O.,	*Arts, Opt.*
McKay, William Lincoln,	Elmira,	*Arts*
Meeker, Frank Oliver,	Franklin, W. T.,	*Science and Letters*
Merrill, Thomas Davis,	Saginaw City, Mich.,	*Engineering*
Monroe, James Smith,	West Milford, N. J.,	*Science & Letters*
Ness, Joseph,	Hoopeston, Ill.,	*Science and Letters*
Oliver, Mary Ellen,	Lynn, Mass.,	*Philosophy*

Pattin, William Bernice,	Fort Plain,	*Science and Letters*
Pickett, William Passmore,	Litchfield, Ct.,	*Science and Letters*
Prado, Bento de Almeida,	Itù S. Paulo, Brazil,	*Agriculture*
Preston, Edward Livermore,	Grinnell, Ia.,	*Engineering*
Putnam, Ruth,	New York City,	*Literature*
Queiroz-Telles, Antonio, neto,	S. Paulo, Brazil,	*Engineering*
Reeves, Arthur Middleton,	Richmond, Ind.,	*Science and Letters*
Rexford, Charles Myron,	Watertown,	*Arts*
Ribiero, Quinliliano Nery,	Minos-Geraes, Brazil,	*Architecture*
Rodriguez, Francisco Valdes,	Havana, Cuba,	*Engineering*
Seaman, William Kelly,	Newburgh,	*Mechanic Arts*
Sellers, Elias Horning,	Fentonville, Mich.,	*Arts*
Smith, Albert William,	Westmoreland,	*Mechanic Arts*
Sweeting, William Hayden,	South Butler,	*Science and Letters*
Thacher, Cornelius Stephen	Hopewell,	*Engineering*
Tibiriça, José Piratininza,	S. Paulo, Brazil,	*Mechanic Arts*
Treman, Robert Henry,	Ithaca,	*Mechanic Arts*
Van Norman, Harvey Justin,	Jasper,	*Science and Letters*
Vasconcellos, Augusto Cezar de,	Rio de Janeiro, Brazil,	*Mechanic Arts*
Wakeley, Arthur Cooper,	Omaha, Neb.,	*Literature*
Weed, Watson,	North Rose,	*Science and Letters*
Welker, Philip Albert,	Toledo, O.,	*Engineering*
Wilcox, Wallace Jay,	Ithaca,	*Mechanic Arts*
Wilson, Francis Manly,	Ithaca,	*Optional*

IN THE THIRD YEAR OR JUNIOR STUDIES.

Alberti, William Maxon,	New Market, N. J.,	*Science and Letters*
Bacon, Charles Putnam,	Hartford, Ct.,	*Philosophy*
Bailey, Henry,	Caughdenoy,	*Science and Letters*
Baker, George Titus,	Iowa City, Ia.,	*Engineering*
Bakes, Robert Owen,	Vevay, Ind.,	*Agriculture*
Barros, Francisco Fernando de	S. Paulo, Brazil,	*Engineering*
Benchley, Paul Zeno,	Ithaca,	*Agriculture*
Bissinger, William,	New York City,	*Optional*
Buchman, Albert,	New York City,	*Architecture*

Cane, Abraham,	Plattsburgh,	*Arts*
Chandler, Walter,	Weldon, Ill.,	*Optional*
Conde, Mary Frances,	Amsterdam,	*Literature*
Congdon, Lenore,	Oberlin, O.,	*Optional*
Corbett, Flora Josephine,	Clayville,	*Science and Letters*
Cornish, Albert Judson,	Hamburg, Ia.,	*Optional*
Demorest, Henry Clay,	New York City,	*Science and Letters*
Dewsnap, Samuel Gatfield,	Middletown,	*Chem. and Physics*
Dounce, George Alexander,	Elmira,	*Arts*
Edwards, William Seymour,	Coalburg, W. Va.,	*Science and Letters*
Ferguson, Nicholas Ephraim,	New Milford,	*Engineering*
Fleischman, Adolph,	Albany,	*Architecture*
Fleming, Minnie Miranda,	Ithaca,	*Literature*
Fuller, Helen Antoinette,	New York City,	*Optional*
Gelatt, Roland Bernard,	Keokuk, Iowa,	*Literature*
Gibson, Stanford Jay,	South New Berlin,	*Science*
Giddings, Lizzie Jane,	Jefferson, O.,	*Science and Letters*
Gifford, Harold,	Milwaukee, Wis.,	*Natural History*
Green, Hattie Lucina,	South Byron,	*Science and Letters*
Gregory, Emily Lovira,	Buffalo,	*Literature, Opt.*
Gregory, Edgar Warren,	Palmyra,	*Engineering*
Haight, James Augustus,	Oshkosh, Wis.,	*Arts*
Hamilton, John Foster,	New York City,	*Architecture*
Haskell, Eugene Elwin,	Forestville,	*Engineering*
Hathaway, Arthur Safford,	Decatur, Mich.,	*Science*
Hermon, Robert,	Washington, D. C.,	*Engineering, Opt.*
Hicks, Margaret,	Syracuse,	*Architecture*
Hostetler, Virgil Newland,	Nopa City, Cal.,	*Science and Letters*
Howland, Edward Cole,	Poughkeepsie,	*Literature*
Hoxie, Susan,	Scipioville,	*Agriculture*
Ingalls, Willis Arnold,	Peterboro,	*Science and Letters*
Jackson, Caroline Cooke,	New York City,	*Science and Letters*
Kennedy, James Carroll,	Troy, Vt.,	*Engineering*
Kent, Robert Streator,	Bay Ridge,	*Science and Letters*
Kerr, Walter Craig,	St. Peter, Minn.,	*Mechanic Arts*
Knapp, Charles Langdon,	Lowell, Mass.,	*Architecture*
Kozima, Noriyuki,	Tokio, Japan,	*Architecture*

Lowenbein, Ernest,	New York City,	*Architecture*
Lucas, Charles Otho,	Greenville, Ohio,	*Science and Letters*
Macy, Ervin Barnes,	Port Byron,	*Science and Letters*
Magner, Edmund,	Andover,	*Science and Letters*
Marx, Henry,	Toledo, O.,	*Mechanic Arts*
Mersereau, Charles Vernon,	Union,	*Engineering*
Millard, Alfred,	Omaha, Neb.,	*Science and Letters*
Mills, Hattie May,	Syracuse,	*Literature*
Moffat, Edmund Judson,	Chatham,	*Literature*
Montignani, John Ferguson,	Albany,	*Literature*
Morris, David Ellis,	Cincinnati, Ohio,	*Arts*
Morse, Edmund Royce,	Rutland, Vt.	*Science and Letters*
Newton, Whitney Treat,	Denver, Col.,	*Science and Letters*
O'Connell, John Richard,	Barrytown,	*Engineering*
Olmsted, Allen Seymour,	Leroy,	*Optional*
Olney, Willard,	Westernville,	*Engineering*
Page, John,	Stafford,	*Engineering*
Parke, Robert Augustus,	Binghamton,	*Mechanic Arts*
Patten, Elsie Belle Manderville,	Binghamton,	*Literature*
Peck, Lyra Rosalind,	West Bloomfield,	*Science and Letters*
Philipp, William Bernard,	Cincinnati, Ohio,	*Science and Letters*
Pierce, Charles Edwin,	Buffalo,	*Science and Letters*
Porter, Luther Henry,	East Orange, N. J.,	*Science and Letters*
Russel, Edward	Ithaca,	*Arts*
Russel, Sarah Jackson,	Ithaca,	*Literature*
Severance, Frank Hayward,	Whitewater, Wis.,	*Science and Letters*
Simons, Seward Adams,	Buffalo,	*Arts*
Simpson, George Frederic,	Lodi,	*Engineering*
Skinner, Frank Woodward,	Brownville,	*Engineering*
Smith, Fred Elias,	Moravia,	*Science and Letters*
Smith, William Joseph,	Charleston,	*Engineering*
Spaulding, Moses Jay,	East Poultney, Vt.,	*Science and Letters*
Suren, Nathan Hagop,	Marash, Asia Minor,	*Mechanic Arts*
Tidball, Walton Caldwell,	Fort Monroe, Va.,	*Chem. and Physics*
Tomkins, Calvin,	Newark, N. J.,	*Science and Letters*
Trueblood, Barclay Tennyson,	Salem, Iowa,	*Chem. and Physics*
Trumbull, Thomas Hooker,	Washington, D. C.,	*Optional*

Van Wormer, Eve Emma,	Glenville,	*Science and Letters*
Warner, James Ward,	Rock Stream,	*Science and Letters*
Washburn, Alfred,	Chappaqua,	*Science and Letters*
Weed, Addison,	North Rose,	*Engineering*
Weed, Mary Elizabeth,	North Rose,	*Literature*
Weinmann, John Henry,	St Johnsville,	*Science and Letters*
Welles, George Matson,	Elmira,	*Science and Letters*
Whiton, Frederic Jeffrey,	Ithaca,	*Arts*
Wilcox, Frank Nelson,	Ithaca,	*Architecture*
Willard, Simon,	Jonesboro, Ill.,	*Natural History, Opt.*
Woodward, Julius Hayden,	Brandon, Vt.,	*Science and Letters*
Wright, Frank Ayres,	Newburgh,	*Architecture*
Young, John Henry Weir,	Cold Spring,	*Natural History*

IN THE SECOND YEAR OR SOPHOMORE STUDIES.

Allison, Charles Rollo,	Oswego,	*Science and Letters*
Arnold, George,	Rochester,	*Science*
Arrigunaga de, Joaquin Gutierez,	Campeche, Mexico,	*Agriculture*
Atwood, Charles,	Moravia,	*Agriculture*
Atwood, Charles Edwin,	Ithaca,	*Science and Letters*
Ayers, Grover,	Vennant, Ill.,	*Philosophy, Opt.*
Babcock, Charles Edward Payne,	Manlius,	*Mechanic Arts*
Bailey, Leon,	Wellsboro, Pa.,	*Arts, Opt.*
Baker, William Apollos,	Yaphank,	*Science and Letters*
Barros-Paes, Fernando de,	S. Paulo, Brazil,	*Engineering*
Baxter, Frank Edward,	St. Louis, Mo.,	*Engineering*
Beckwith, John Dorr,	Cedarville,	*Science and Letters*
Benham, George Washington,	Norwalk, O.,	*Science and Letters*
Bird, William Noble Davis,	Ithaca,	*Agriculture*
Bissell, Esse Clarissa,	South Bend, Ind.,	*Science and Letters*
Bliss, Henry Dwight,	Holley,	*Agriculture*
Boyer, Arthur Grindage,	Aurora,	*Natural History Opt.*
Bradley, Willis Clifford,	Cedar Rapids, Iowa,	*Science & Letters*
Brown, Henry Kirk,	Syracuse,	*Science and Letters*
Buck, Helen Albertian,	Watkins,	*Science and Letters*
Carpenter, Charles Raymond,	Leavenworth, Kan.,	*Nat. Hist., Opt.*

Carpenter, William Henry,	Utica,	*Optional*
Carrier, William Harvey,	Phœnix,	*Agriculture*
Chamberlin, John Calvin,	Cannonsville,	*Science*
Chapman, Edwin Lyon,	Monroe, Mich.,	*Literature, Opt.*
Clements, Gabrielle Devaux,	Philadelphia, Pa.,	*Natural History*
Cobb, Fred. Carlton,	Andover.	*Philosophy*
Coffin, John,	Genoa, Neb.,	*Mechanic Arts, Opt.*
Cole, Emma Jane,	Lowell, Mich.,	*Science and Letters*
Cook, Charles Button,	Buffalo,	*Architecture*
Cramphin, Harry Alexander,	Morrisville,	*Science and Letters*
Curtis, Frank Smith,	Moravia,	*Science and Letters*
Curtiss, Edward Whitehead,	Whitewater, Wis.,	*Mechanic Arts*
Drake, Jeremiah Clinton Merle,	Westfield,	*Natural History, Opt.*
Eberman, Frank Potts,	Strasburg, Pa.,	*Science and Letters*
Farquhar, Richard Henry,	Little Rock, Ark.,	*Optional*
Finch, William Albert,	Ithaca,	*Arts*
Fishel, Frederic Eugene,	Patchouge,	*Literature, Opt.*
Flanigan, John Richard,	Binghamton,	*Arts*
Fleming, George Claudius,	Ithaca,	*Arts*
Forbes, Lewis Eugene,	Mayville, Wis.,	*Science and Letters*
Force, Lafayette,	Tekama, Neb.,	*Science and Letters*
Fox, Walter Howard,	Portland, Me.,	*Agriculture*
Frear, Lewis Baltus,	Ithaca,	*Science and Letters*
Gardner, William,	Syracuse,	*Science and Letters*
Gaunt, Thomas Townsend,	Poughkeepsie,	*Optional*
Gifford, George Francis,	Jamestown,	*Science and Letters*
Goodwin, DeWitt,	Dresserville,	*Literature, Opt.*
Green, Robert Packer,	Media, Pa.,	*Engineering*
Halpen, Annie Marie,	Albany,	*Science and Letters*
Hamilton, Justus Albert,	Ottumwa, Ia.,	*Science*
Haskell, George Frederick,	Albany,	*Science and Letters*
Havens, Rodman Wesley,	Ellenburgh,	*Engineering*
Hawkins, Carlton Richmond,	East Hamburg,	*Optional*
Hayes, Rutherford Platt,	Fremont, O.,	*Science and Letters*
Henry, William Arnon,	Defiance, O.,	*Agriculture*
Hill, Henry Benjamin,	Rome,	*Literature Opt.*
Hill, Lena Lilian,	Isle La Motte, Vt.,	*Science and Letters*

Hills, Harold Edwards,	Auburn,	*Optional*
Humphrey, Charles,	Ithaca,	*Science and Letters*
Huntley, Willis Arnold,	Troy,	*Literature*
Hutchins, Albro Warner,	Ithaca,	*Agriculture*
Hyde, Charles Howell,	Wolcott,	*Arts, Opt.*
Irvine, Frank,	Sharon, Pa.,	*Science*
Jackson, William Erastus,	Wilmington, Del.,	*Architecture*
Johnston, William Eugene,	Cooperstown,	*Arts*
Jonas, Albert,	Buffalo,	*Optional*
Jones, Frank Henry,	Trumansburg,	*Agriculture, Opt.*
Kelley, Florence Molthrop,	Germantown, Pa.,	*Literature*
Kelley, Irving Washington,	Kelley's Island, O.,	*Mechanic Arts*
Kelley, William Datus,	Kelley's Island, O.,	*Mechanic Arts*
Kendig, John Landon,	Waterloo,	*Philosophy*
Knapp, James Louis,	Union,	*Science and Letters*
Landon, Eugene Ashbel,	Vineland, N. J.,	*Optional*
Lathrop, Oscar Garland,	Ackworth, N. H.,	*Science*
Lawrence, Frederick Cross,	Minneapolis, Minn.,	*Science & Letters*
Leary, James Thomas,	Ithaca,	*Science and Letters*
Leeds, Charles Starr,	Richmond, Ind.,	*Science, Opt.*
Leighton, Herbert Jackson,	Ithaca,	*Mechanic Arts*
Lemen, James Arthur,	Dansville,	*Science*
Leonard, Zenas Lockwood,	Providence, R. I.,	*Optional*
Lovelace, Frederic Lauren,	Dundee,	*Philosophy*
Mack, George William,	Ithaca,	*Mechanic Arts*
Manierre, Charles Edward,	Chicago, Ill.,	*Natural History*
Mann, Gustav Marcus,	Milwaukee, Wis.,	*Agriculture*
Mason, Milo Leland,	Ithaca,	*Optional*
Martin, Andrew Richey,	Alleghany City, Pa.,	*Arts, Opt.*
McDermid, Henry Angus,	Hillsdale, Mich.,	*Mechanic Arts*
McKinstry, Charles Herbet,	Canajoharie,	*Optional*
Mendes, Octaviano Abdon Pereira de,	S. Paulo, Brazil,	*Architecture*
Merry, Addison Delavan,	Phœnix,	*Science and Letters*
Mesick, David Wilson,	Kinderhook,	*Engineering*
Mesick, Frederick Peter,	Kinderhook,	*Engineering*
Messenger, Hiram John,	Cortland,	*Literature*
Mills, Arthur Eugene,	New York City,	*Architecture*

Morris, Robert Tuttle,	New Haven, Ct.,	*Natural History, Opt.*
Munson, George,	New York City,	*Architecture*
Nixon, Charles Elstun,	Cincinnati, O.,	*Optional*
Norton, Henry Mark,	New York City,	*Agriculture*
Norton, James Eddy,	Belmont,	*Literature*
O'Brien, Michael John,	Bergen,	*Science and Letters*
Ormsby, Frank Worden,	Oswego,	*Engineering*
Otis, George Franklin,	Boston Mass.,	*Mechanic Arts*
Otis, Philip Arthur,	Leeds, Mass.,	*Mechanic Arts*
Outram, Thomas Sidney,	Easton, Md.,	*Agriculture*
Palmer, Nettie Amelia,	Ithaca,	*Natural History*
Parsons, Frank Hall,	Montclair, N. J.,	*Agriculture, Opt.*
Pennock, Charles John,	Ithaca,	*Agriculture*
Phelps, Susanna Stuart,	Morrisville,	*Literature*
Pierce, Henry,	Powling,	*Engineering, Opt.*
Pierson, Charles Bertram,	Canandaigua,	*Science and Letters*
Poole, Murray Edward,	Ithaca,	*Arts*
Roberts, Mary Elizabeth,	Ithaca,	*Philosophy, Opt.*
Rose, Alice Evelyn,	Cleveland, O.,	*Science and Letters*
Rudd, Willis Nathaniel,	Ithaca,	*Natural History*
Ruditch, Pineas,	Odessa, Russia,	*Agriculture*
Russel, Willliam Channing, Jr.,	Ithaca,	*Arts*
Ryder, Clayton,	Carmel,	*Science and Letters*
Sanger, Edward Berry,	Rockville Centre,	*Natural History*
Shackford, Lucy Bartlett,	Ithaca,	*Literature*
Sheldon, Charles Stiles,	Oswego,	*Natural History*
Slauson, Allan Bedient,	Weedsport,	*Philosophy*
Smith, Cornelia Delap,	Cambridge, Mass.,	*Arts*
Smith, Frederick William,	Ithaca,	*Arts*
Smith, Robina Silsbee,	Cambridge, Mass.,	*Arts*
Snyder, Harry Wilson,	Freeport, Ill.,	*Agriculture*
Soule, Henry Howard,	Syracuse,	*Literature*
Stanton, Robert Livingston,	Tenafly, N. J.,	*Science and Letters*
Sweet, Carol Lincoln,	Phœnix,	*Science and Letters*
Sweeting, Mary Anna,	South Butler,	*Optional*
Terry, Edmund Burke,	Waterville,	*Science add Letters*
Thomas, Frank Salter,	Bay Ridge,	*Science and Letters*

Tidball, John Satterlee,	Fort Monroe, Va.,	*Science and Letters*
Tiffany, Frank Giles,	Gainesville,	*Science and Letters*
Tilton, John Neal,	Rome, Italy,	*Architecture*
Tilton, Paul Henry,	Rome, Italy,	*Mechanic Arts*
Tracy, Aurelius Milford,	Ghent,	*Science and Letters*
Trelease, William,	Brooklyn,	*Natural History*
Trump, Edward Needles,	Wilmington, Del.,	*Mechanic Arts*
Turner, Samuel Bates,	Ithaca,	*Literature*
Underhill, Isaac Morse,	Norwalk, O.,	*Science and Letters*
Upjohn, Richard Russell,	Brooklyn,	*Engineering*
Vail, Alfred Tennyson,	Chester,	*Science and Letters*
Vance, Lee James,	Penn Yan,	*Science and Letters*
Wagner, Charles Gray,	Whitesboro,	*Natural History*
Waterbury, John Calvin,	Rensselaerville,	*Mechanic Arts*
Webster, Hosea,	Oyster Bay,	*Science*
White, Seward,	West Township,	*Optional*
Whitney, Frank Curtis,	West Danby,	*Arts*
Wilcox, Nellie,	Ithaca,	*Literature, Opt.*
Wilhelm, Henry Walter,	Toledo, O.,	*Engineering, Opt.*
Williams, Henry Kirk,	Dunkirk,	*Chemistry, Opt.*
Wing, Albert John,	Albany,	*Science*
Wise, Otto Solomon,	New York City,	*Science and Letters*
Woolworth, Amulet May,	Turin,	*Science and Letters*

IN THE FIRST YEAR OR FRESHMAN STUDIES.

Adams, Edward Shields,	Chicago, Ill.,	*Optional*
Ainslie, James Stewert,	Hartwick,	*Arts*
Allen, John Granger,	Aurora,	*Mechanic Arts*
Alling, Robert Bertine,	Bangall,	*Optional*
Ayers, William Judson,	Cairo, Ill.,	*Optional*
Aylen, Henry,	Aylmer, Canada,	*Science and Letters*
Bates, William Horatio,	Washington, D. C.,	*Agriculture*
Battin, Henry Wilson,	Albany,	*Engineering*
Benedict, Thomas, Jr.,	Pittston, Pa.,	*Engineering*
Booth, Quentin Woodbury,	Rochester,	*Mechanic Arts*

Bowman, Seward Lincoln,	New Lisbon, O.,	*Optional*
Boyer, Israel Donald,	Dayton, O.,	*Mechanic Arts*
Brader, William Barton,	White Haven, Pa.,	*Optional*
Bredin, George Sloan,	Butler, Pa.,	*Optional*
Brown, William Clinton,	Sandusky, O.,	*Mechanic Arts*
Buckley, Henry Horatio,	Unadilla,	*Optional*
Bullis, Abram Rogers,	Macedon,	*Mathematics*
Burr, Ella,	Newark Valley,	*Literature*
Burr, George Lincoln,	Newark Valley,	*Arts*
Campbell, Edwin,	Mumford,	*Optional*
Candee, Fred Jason,	Moline, Ill.,	*Chem. and Physics*
Carey, Frank,	Fond du Lac, Wis.,	*Optional*
Carll, Richard Clinton,	Northford,	*Optional*
Carman, Frederick Douglass,	Jacksonville,	*Arts, Opt.*
Carpenter, George,	Utica,	*Natural History, Opt.*
Cartwright, Robert, Henry,	Rochester,	*Mechanic Arts*
Catchpole, Edwin Watson,	Rose,	*Agriculture*
Cheek, Sue Powell,	Danville, Ky.,	*Optional*
Cheney, Miles Eugene,	Bemus' Point,	*Optional*
Chevaler, Josephine,	Boston, Mass.,	*Chemistry, Special*
Chittenden, Frank Hurlbut,	Brooklyn,	*Natural History, Opt.*
Clarke, Percy Edwards,	Washington, D. C.,	*Optional*
Collins, Homer,	Rochester,	*Science, Opt.*
Collmann, John Saunders,	Freeford Falls, Ill.,	*Science and Letters*
Concklin, Henry Sisson,	Poughkeepsie,	*Literature*
Copp, Fred Malin,	Jordan,	*Optional*
Cornell, George,	Central Valley,	*Optional*
Cowles, Albert Hutchingson,	Cleveland, O.,	*Optional*
Cummins, Howell Adin,	Conneaut, O.,	*Mechanic Arts*
Cunningham, Andrew,	S. Framingham, Mass.,	*Literature, Opt.*
Curtice, Fred Cooper,	West Winsted, Ct.,	*Natural History*
Davenport, Arthur,	Varna,	*Arts*
Davis, Floyd,	Ithaca,	*Engineering*
Day, Harriet McHarg,	Cooperstown,	*Arts*
Dominick, DeWitt Clinton,	Gallupville,	*Optional*
Downing, Elizabeth,	Ithaca,	*Science and Letters*
Eastman, Adelbert Lyon,	Arcade,	*Optional*

Ehrlicher, Frederick Matthias,	Watertown,	*Science and Letters*
Eidlitz, Otto Marc,	New York City,	*Engineering*
Elliott, George Robert,	Auburn,	*Optional*
Elstun, Volney,	Cincinnati, Ohio,	*Agriculture*
Eustis, George,	New Orleans, La.,	*Mechanic Arts*
Ewing, Addison Luther,	La Grange, Wis.,	*Optional*
Ferris, George Ferris,	Philadelphia, Pa.,	*Engineering*
Flanigan, Walter Jerome,	Binghamton,	*Arts*
Foster, Charles Ebenezer,	Ithaca,	*Agriculture*
Gilbert, Rizpah Margaret,	Le Roy,	*Literature*
Glascock, Jacob Luther,	Philippi, W. Va.,	*Arts, Opt.*
Greve, Alfred,	St. Louis, Mo.,	*Arts*
Gusdorf, Moses,	Fremont, O.,	*Philosophy*
Hall, Charles,	St. Louis, Mo.,	*Optional*
Halsey, David Rogers,	Bridgehampton,	*Arts, Opt.*
Hamrick, Jesse Davis,	Belleville, Ind.,	*Agriculture*
Harding, Frank,	Callicoon,	*Optional*
Heron, Nannie Jacobs,	Danville, Ky.,	*Optional*
Herrick, William Porter,	East Randolph,	*Literature*
Heyl, Harriet,	Dunkirk,	*Literature*
Hill, Thadeus,	Richmond, Ind.,	*Literature*
Hoag, William Isaac,	Aurora,	*Science*
Holcomb, James Warren,	Ravenna, O.,	*Optional*
Holmes, William David,	Pittsburgh, Pa.,	*Optional*
Hornor, Charles West,	New Orleans, La.,	*Science*
Howell, Frederic James,	Keokuk, Iowa,	*Optional*
Howland, Isabel,	Sherwood,	*Science*
Hoyt, William Ballard,	East Aurora,	*Optional*
Hungerford, Nye,	Ithaca,	*Agriculture*
Hunter, Nathaniel Perry,	Jasper,	*Arts, Opt.*
Jaynes, DeLos Dan,	North Norwich,	*Science and Letters*
Kelso, John Sinclair,	Stamford, Ct.,	*Engineering*
Kilbourne, Frederic Lucius,	Moravia,	*Agriculture*
Locke, Henry Lincoln,	West Dedham, Mass.,	*Agriculture*
Lounsberry, John Wesley,	Hammondsport,	*Optional*
Lnx, Charles Augustus,	Clyde,	*Literature*
Mann, Willis Thompson,	Somerset,	*Agriculture*

Martin, George,	Alleghany City, Pa.,	*Optional*
Marvin, Charles Deming,	Montclair, N. J.,	*Architecture*
McConnell, Benjamin Franklin,	Chicago, Ill.,	*Optional*
McClumpha, George,	Amsterdam,	*Optional*
Millard, Charles Ketchum,	North Adams, Mass.,	*Optional*
Miller, Irvine,	Washington, D. C.,	*Literature*
Morrow, Charles Edwin,	New York City,	*Mechanic Arts*
Moses, Willis Holley,	Malone,	*Science and Letters*
Mott, David Wallace,	Bangor,	*Optional*
Northrop, May,	Woodhull,	*Optional*
Ogden, Charles Edwin,	Penn Yan,	*Optional*
Olmsted, Charles,	Tarrytown,	*Science and Letters*
Ostrander, Will Sterling,	Schuylerville,	*Optional*
Otis, Hanna Wood,	Sherwood,	*Optional*
Palmer, Edgar Anson,	Cortland,	*Mechanic Arts*
Palmer, Milton Cornelius,	Sing Sing,	*Science and Letters*
Parmelee, Robert Murray,	Cleveland, O.,	*Optional*
Parmenter, Syrel,	Cohocton,	*Science*
Place, Ira Adelbert,	Alfred Centre,	*Optional*
Read, Jesse Edwin,	Greenpoint,	*Engineering*
Reeve, Benjamin Harry,	Mattituck,	*Optional*
Rhodes, Kate,	Trempealeau, Wis.,	*Optional*
Rich, Fred William,	West Potsdam,	*Engineering*
Rites, Francis Marion,	Chester,	*Mechanic Arts*
Roehrig, Fred Lewis,	Ithaca,	*Philosophy*
Rogers, Walter Geer,	Ausable Forks,	*Optional*
Rundell, Forest Parlen,	De Kalb Junction,	*Optional*
Ryman, Frederick Sweasy,	Wilkesbarre, Pa.,	*Arts, Opt.*
Salisbury, Herbert Lucius,	Marcellus,	*Mechanic Arts*
Sanchez, Tiberio Sanchez,	U. S. Colombia,	*Agriculture*
Scammon, Richard Montgomery,	Stratham, N. H.,	*Science and Letters*
Schumm, George,	Sauk City, Wis.	*Literature*
Seymour, Frederick Hubert,	Lockport,	*Mechanic Arts*
Shippen, Henry,	Jamaica Plains, Mass.,	*Optianal*
Shiras, George,	Pittsburgh, Pa.,	*Optional*
Schnable, Emile Ralph,	Chicago, Ill.,	*Engineering*
Smith, Edward Sholl,	Canajoharie,	*Science and Letters*

Smith, Theobald,	Albany,	*Mathematics*
Smyth, Elinor Jeanette,	Owego,	*Optional*
Sommers, Harry Cantine,	Ithaca,	*Arts*
Stambaugh, Henry Hamilton,	Youngstown, O.,	*Science and Letters*
Stearns, James Brainard,	Rouse's Point,	*Arts, Opt.*
Storey, William,	Rochester,	*Engineering*
Studley, Duane,	South Byron,	*Science and Letters*
Taylor, Oscar Livingstone,	Freeport, Ill.,	*Science and Letters*
Teague, Clara Louisa,	Caribou, Me.,	*Science and Letters*
Thomas, Charles Elu,	Waterloo,	*Agriculture*
Thompson, Ervin William,	Smithville, Ga.,	*Mechanic Arts*
Tompkins, Myron,	Ithaca,	*Science and Letters*
Tyson, Frank Charles,	Chicago, Ill.,	*Engineering*
Upton, Charles Olmsted,	Clymer,	*Agriculture*
Van Duzer, William,	Horseheads,	*Arts*
Vaughn, Edward Gilpin,	Richmond, Ind.,	*Science and Letters*
Walters, William Andrew,	Phoenix,	*Architecture*
Waterbury, Henry Talmadge,	Rensselaerville,	*Mechanic Arts*
Watson, George Catchpole,	Clyde,	*Agriculture*
Wendell, Henry Ten Eyck,	Chicago,	*Architecture*
Weston, Albert Theodore,	Salem,	*Engineering*
Wick, Richard Brown,	Pittsburgh, Pa.,	*Mechanic Arts*
Wightman, Willard Humphrey,	Hastings,	*Engineering*
Wing, Henry Hiram,	Willow Brook,	*Agriculture*
Withington, Alfreda Bosworth,	South Amboy,	*Literature*

SUMMARY BY YEARS.

In Senior or Fourth Year Studies	72
In Junior or Third Year Studies	96
In Sophomore or Second Year Studies	155
In Freshman or First Year Studies	146
Undergraduates	469
Post Graduates	21
Total in the University,	490

SUMMARY BY COURSES.

Courses.	Seniors.	Juniors.	Soph.	Fr.	Total.
Arts	7	7	13	14	41
Literature	3	11	13	11	38
Philosophy	2	1	6	2	11
Science	1	2	9	5	17
Science and Letters	19	31	43	16	109
Chemistry and Physics	3	3	1	2	9
Mathematics	0	0	0	2	2
Natural History	2	3	12	3	20
Agriculture	2	3	16	14	35
Architecture	2	9	6	3	20
Civil Engineering	14	15	10	13	52
Mechanic Arts	14	4	13	15	46
Optional	3	7	13	46	69
Total of Undergraduates					469

THE CORNELL UNIVERSITY.

GENERAL VIEW.

FOUNDATION.

The existence of the Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge of tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts, amounting to several hundred thousand dollars.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation" and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based.

In accordance with the requirements of its charter, the Institution was duly opened on the seventh of October, 1868.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868–69—provides for the support and maintenance of colleges, "where," in the language of the Act, "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches as are related to Agriculture and the Mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated.

THE UNIVERSITY AND THE STATE.

The Act of Incorporation after citing the words of the Congressional Act (declaring the leading purpose of the land grant), adds. "And such other branches of Science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University as the Trustees may deem useful and proper."

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students.

The Trustees of the University have placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four for each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of nearly forty thousand dollars *per annum*.

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Technical Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, or Natural History; or he may, subject to the approval of the Faculty, take an *Optional Course*, under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. No student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which might otherwise occur,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to consult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University; otherwise the student will be compelled to wait and thus lose one year of his scholarship. The successful candidate is subject to the usual entrance examination on arriving at the University. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-three. Of these, the eldest son of the Founder is, by the law of the State, a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of

Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, hold frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the supervision of the various courses of study, and such duties as generally appertain to an academic Faculty. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties:

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient Classical Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History. Each of these Faculties have special charge of the studies in some one or more of the General Departments of study.

TERMS AND VACATIONS.

The Academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-seven weeks of term-time in the academic year.

For the beginning and ending of terms and vacations of each year, and other matters of detail relating to them, see the Calendar, p. 7 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince misapprehension in regard to its plan and organization. This has rendered the subjoined statements necessary:—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactorily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students from any State or country.* Free instruction for undergradutes is given only to State Students, and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York But all others are received, whatever may be the State or

country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows:—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers*, some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which result from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

3. *The Prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

RELIGIOUS INSTRUCTION.

The University was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view. It would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

In the University Chapel—the gift of Henry W. Sage—religious services are held, in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. These discourses are delivered during the first and third terms of each year, and usually two on each Sunday.

HIGHER EDUCATION OF WOMEN.

It was the wish of the Founder and other influential friends of the University, from the first, that it should be open and its means and facilities for education should be offered to all, irrespective of sex, color, or nationality. And by an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building—the Sage College for Women has been completed and is in readiness for use. There is no separate Course or Department for women students, the Entrance Examinations are the same for them as for the young men and depend upon the course they intend to pursue. Neither are there any separate classes formed for them, the only distinction made is, that a separate building has been provided by the liberality of Mr. Sage for them to live in, if they choose to avail themselves of the opportunity. While the leading object of the movement is perhaps to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course, those who have been chiefly instrumental in making these arrangements, are earnest believers in the co-education of the sexes.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through academy, college, etc., up to the fullest development of educational resources in a well endowed and completely

equipped university, with its technical departments for the useful Arts and its professional schools for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate Degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate Degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its professors, are placed at the service of its own graduates, and of the graduates of like standing from other colleges and universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they have occasion to use in the prosecution of their studies and investigations. Already quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate professor or Special Faculty.

SELF-SUPPORT BY STUDENTS.

Young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and in a very few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. Self-

support, to any extent, requires energy, persistence and sacrifice; and even a skillful mechanic should have some means in reserve, so that his energies in the University will not be diverted from mental to manual labor. Most of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work; but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. The number of young men applying for such labor has constantly exceeded the number that the University is able to employ; and it must be distinctly understood that the University will not ***guarantee employment to any student.***

THE UNIVERSITY TOWN.

Ithaca, the seat of the University, is a town of about ten thousand inhabitants, situated at the head of Cayuga Lake, in Tompkins County, New York. It is accessible from the East, South and West by means of the Erie Railway, leaving that road either at Owego, thence to Ithaca by the Ithaca branch of the Delaware and Lackawanna Railway, or at Waverly, from which place the Ithaca and Athens Railroad leads to Ithaca; or passengers can leave at Elmira, and come directly to Ithaca. From the North there are three roads that leave the New York Central (Auburn Branch), one at Geneva, one at Cayuga Bridge, and the third is the Southern Central, which leaves at Auburn, and crosses the Ithaca and Cortland Road at Freeville. Or persons may leave the New York Central at Syracuse, and reach Ithaca by way of Cortland. The Ithaca and Cortland Railroad starts from the immediate vicinity of the University buildings, and connects with the Southern Central Railroad at Freeville, a distance of nine miles, and with the Syracuse and Binghamton Railroad at Cortland, a distance of twenty miles from Ithaca; in the former case reaching the New York Central Railroad at Auburn, and in the latter at Syracuse.

SCOPE OF THE INSTRUCTION.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words :—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

The instruction given in the University is distributed into several Departments, some of which are subdivided into Schools; and out of these Schools and Departments there are made up four General Courses and six Technical or Special Courses, as will be seen more fully below under the head of "Courses of Study."

I. DEPARTMENT OF AGRICULTURE.

The simple requirements for admission to the Course in Agriculture put the advantages which it offers within the reach of every enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in Agriculture before any others who may wish for this work.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the

class-room exercises, the student devotes as much time as can be profitably spared for the purpose, to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

Students in the Department of Agriculture enjoy, in common with all members of the University, the privilege of using the University Library, and of attending any lectures given in the University.

In Practical Agriculture five hours weekly during the senior year are devoted to technical instruction; this time being divided between lectures, reviews, agricultural calculations and farm accounts. Besides this the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

Tuition is *free of charge.* Students in Agriculture, whether optional or in either of the two regular courses, are required to do a certain amount of farm work *without compensation* as part of their instruction.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas's "American Fruit Culturist;" Kent's "Landscape Gardening."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Anderson's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius's "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening."

VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:—1. Five lectures a week extending over the entire academic year. 2. Laboratory work on the bones, skeletons,

clastic models, pathological preparations, and parasites of the domestic animals. 3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm, the various systems of organs and functions being taken up in turn and the differences pointed out together with the bearing of these variations on their healthy management and diseased processes. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses, such as draught, speed, endurance, early maturity and propensity to fatten, milking qualities, etc.; to the data for determining the age; to the principles of breeding, of shoeing, etc.

The Second Term is appropriated to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals and of veterinary surgery. The general principles which must guide in all surgical manipulations are stated, the various operations practiced on the domestic animals are described, and these are illustrated when suitable subjects present themselves.

In Veterinary Science an opportunity is afforded to students who desire it, to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study of the School.

Text-Books.—Chauveau's "Comparative Anatomy of the Domestic Animals;" Colin's "Physiologie des Animaux Domestiques;" Marshall's Outlines of Physiology;" Law's "Principles and Practice of Veterinary Medicine and Surgery."

Books of Reference.—Leyh's "Handbuch der Anatomie der Hausthiere;" Gamgee and Law "Anatomy of the Domestic Animals;" Stephen and Seller "Physiology at the Farm;" Goodale's "Breeding;" Low's "Domesticated Animals;" Gamgee's Domestic Animals in Health and Disease;" Percivall's "Hippopathology;" Williams' "Principles and Practice of Veterinary Medicine and Surgery;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Baumeister's "Geburtshülfe;" Rainard's "Parturition;" Delwart's "Parturition;" Fleming's "Veterinary Sanitary Science

and Police;" Reynal's "Traité de la Police Sanitaire;" Miles "On the Foot;" Rey's "Marechalerie;" Bouley and Reynal "Dictionaire de Médicine Vétérinaire."

II. ARCHITECTURE.

The course of study in Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Faculty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practiced in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Any student may attend the lectures on building materials and construction; but, with these exceptions, all students entering the department will be required to pursue the regular course of study, prescribed for the Degree of Bachelor of Architecture.

III. CHEMISTRY AND PHYSICS.

I. SCHOOL OF CHEMISTRY AND MINERALOGY.

The instruction in chemistry begins with the lectures on general chemistry in the second term of the Sophomore year. During that and the succeeding term three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. In addition to the final examination at the end of each term occasional examinations are held during the term of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times. During the first term of the Junior year a course of lectures will be given on the chemistry of organic bodies; it will be restricted to the consideration of the more frequently occurring bodies of organic origin, which the student is constantly meeting in his every-day life.

The Introductory Chemical Practice may be taken in the second Sophomore term, but is required of all students in the

Special Course in Science in the third term. This practice consists in the performance by the student of a series of experiments contrived and arranged for the illustration of the more important general principles of chemistry, as well as for the cultivation of his powers of observation; while the details of the manipulation of each experiment are carefully described, the student is required to observe the results for himself and trace their connection with the principle illustrated.

The Special Chemical Course.—This is arranged for those desiring to accomplish as much as possible during the four years of a college course towards fitting themselves for the profession of chemistry. It includes, besides some study of other sciences, of mathematics, and French and German, attendance on lectures on general, organic, technical, and analytical chemistry, and a course of practice in qualitative analysis, including blow-piping, and in quantitative analysis, including assaying, the analysis of ores and minerals in the wet way, of organic substances, waters, gases, articles of food, etc.

Agricultural Chemistry.—This comprises a course of lectures on the chemistry of the elementary and compound substances concerned in the growth of plants and animals, the chemistry of vegetable and animal life, of soils and manures, and of agricultural technology. The laboratory practice, except in the full course of four years, is confined to the qualitative and quantitative analysis of such substances as may be met with in the course of ordinary agricultural practice, and requires from four hundred to four hundred and fifty hours for its completion.

Chemical Technology.—A course of lectures is given, in the third terms of two successive years, on the applications of chemistry in the arts and industries. It will embrace the study of the chemical principles involved, and of the manipulation required, in the commercial preparation of acids, alkalies, salts, fats, oils, soaps, coal gas, coal tar, coloring matters, glass, pottery, mortars, textile fabrics, leather, paper, etc. The course will be supplemented by excursions to such mills and manufactories as are accessible, and by special laboratory practice in the detection of adulterations, and the valuation of commercial samples.

Medical Chemistry.—This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Course in blow-piping.—This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work,

when it becomes necessary to make out the character of a rock or mineral.

Metallurgy and Mineralogy.—During the second term two lectures a week are devoted to each of these subjects in alternate years. The course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction; the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in Blow-pipe Analysis with practice in the identification of crystalline forms is required in connection with the lectures on Mineralogy.

Laboratory expenses.—Students in the laboratory will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices. They will be required to make a deposit with the Treasurer of a small sum to cover these charges, before beginning work in the laboratory, except when delay is allowed by special permission of the professor in charge.

Text books and works of reference.—Thorpe "Inorganic Chemistry;" Barker, "College Chemistry;" Caldwell and Breneman, "Introductory Chemical Practice;" Crafts, "Qualitative Analysis;" Fresenius, "Qualitative Chemical Analysis" and "Quantitative Chemical Analysis;" Caldwell, "Agricultural Chemical Analysis;" Elderhorst, "Blow-pipe Analysis;" Kerl, "Probirkunst;" Plattner, "Use of the Blow-pipe;" Sutton, "Volumetric Analysis;" Mohr, "Titrirmethoden;" Thorpe, "Quantitative Chemical Analysis;" Rose, "Chimie Analytique;" Burdon-Sanderson, "Handbook for the Physiological Laboratory;" Storer, "Dictionary of Solubilities;" Gmelin, "Handbook of Chemistry;" Miller, "Elements of Chemistry;" Watts, "Dictionary of Chemistry;" Schorlemmer, "Organic Chemistry;" Wurtz, "Dictionnaire de Chimie;" Graham-Otto, "Lehrbuch der Chemie. Handwörterbuch der Chemie."

II. SCHOOL OF PHYSICS.

The instruction in the general course in Physics begins with the first term of the second year and continues six terms, as follows:—

First term.—Mechanics of solids, liquids, and gases. Three exercises per week. *Second and third terms.*—Magnetism and electricity. Two exercises per week. *Fourth term.*—Heat. Two exercises per week. *Fifth and sixth terms.*—Acoustics and optics. Three exercises per week.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference;—Atkinson's Ganot's "Physics," Jamin's "Cours de Physique" and "Petit Traité de Physique," Müller's "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics," Jenkin's "Electricity and Magnetism," Maxwell's "Theory of Heat," Schellen's "Spectrum Analysis."

Besides the above general course, there will be an opportunity for a few students who wish to make Physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course:—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

IV. CIVIL ENGINEERING.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analysis to the solution of engineering investigations, the professional preparation of the students comprises the following subjects:—Free-hand drawing, machine-shop practice, blowpipe analysis of minerals, geology, elementary and structural, metallurgy; the location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The sphere of action of the Civil Engineer is so broad and diversified, that no educated engineer pretends to be equally well prepared in all the various specialties into which the profession has been subdivided by social necessities and common consent. To

meet the loud demand for special engineering studies, efforts will be made from the beginning of the third year of the course, to al-.ow of option and diversity of special studies, so far as the means at our disposal will allow. In this manner this department will foster the development of special fitness among the various classes of students, who by natural inclination may prefer a more or less extended study of any particular branch of Civil Engineering.

The great subdivisions of the work under this department are:—Hydraulic engineering, railroad engineering, bridge architecture and construction, topographical engineering, industrial engineering and mining engineering.

At present we have no more than general facilities for beginning the education of Industrial and Mining Engineers, and we are not prepared to offer superior inducements to students pursuing these important branches as a specialty. Appropriate chairs for this purpose will be created at an early day.

We can offer, however, a complete theoretical and practical course in Civil Engineering, embracing a thorough treatment of the first four great subdivisions enumerated above.

The course in Topographical Engineering is designed for those students who may find distasteful the investigation of the higher mechanics as applied to civil constructions, and who may show, instead, special aptitude for geodetical work. Since the recent great surveying expeditions sent out by the U. S. government took the field, there has been an incessant demand for men specially fitted for the important duties of the explorer and the geographical engineer; and in the work of our well known U. S. Coast Survey, there is also an ample field for the efforts of properly trained geographers and topographers. To provide for this and similar demands, a special course is now in full operation. It is properly manned by efficient instructors and its equipment of general and special instruments has been collected at great expense and is very complete. During their connection with this department students taking the course in Topographical Engineering will have an opportunity to perform work as accurate and extensive as is done in the actual details of the U. S. Coast Survey, and in the geodetic surveys of European governments.

Besides the above, there is a course in Surveying and another course in Draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading, pen and colored topography, machine drawing, and the use of projection tables.

The degree of Civil Engineer is conferred, on the recommendation of this Faculty, upon those who, having taken the Bachelor's degree, shall have spent two years in additional special studies and actual practice, passed the requisite examinations, and presented a satisfactory thesis.

V. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others.

In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history—and thus to enlarge, by careful reference and reading, their acquaintance with the facts presented by the lecturers. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern civilization.

The School of Political Science, is intended to embrace all the important topics connected with political and social science. At present, courses of lectures are delivered, as will be seen below, on political economy and constitutional law.

The following is a list of the lectures given in this department:—(1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2.) Modern history, and the philosophy of modern history, by President White. (3.) The general and constitutional history of England, by Professor Goldwin Smith. (4.) General history, and the philosophy of history, by Professor Wilson. (5.) History of the United States. (6.) American constitutional history, by Professor Dwight. (7.) Political economy, by Professor Wilson.

VI. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

I. SCHOOL OF THE ANCIENT LANGUAGES.

I. THE GREEK LANGUAGE.

FIRST YEAR.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

SECOND YEAR.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Phoenissae); Æschylus (Septem); Aristophanes (Acharnians).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII, and Curtius' History of Greece, books III and IV; Greek philology and composition: Sophocles (Ajax, Oedipus Coloneus): Plato (Protagoras).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from Pindar and Theocritus.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.*—Cicero (Essays and Letters.) *Third Term*—Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*—Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.*—Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

The languages in this school are entirely optional and none of them required for any degree conferred by the University.

The instruction in this Department is given for the present by Professors Fiske, Rœhrig and Wilson, and is distributed as follows:

The Modern Persian is taught by Professor Fiske. There have already been several classes in this language and the Professor is ready to begin a new class whenever there are students desirous of pursuing it.

Professor Rœhrig gives the instruction in the living Asiatic Languages and in the Sanskrit, Old Persian and Arabic. Prof. Rœhrig commenced with an elementary course in *Chinese*, which lasted two years. He then added instruction in *Japanese* (grammar, practical exercises in the Hiragana character, etc.) At the same time he delivered lectures to the students on *Mantchoos*, *Turkish*, the *Tartar Languages*, *Turanian Philology*, etc. A two years' course of Arabic followed, and finally Sanskrit has become one of the principal objects of this department.

The Professor also presents to his classes, in succession from year to year, grammatical outlines and philological sketches of such languages of the East, as may be most instructive and of particular interest to the student of ethnographical philology and general linguistic science.

Text books used, and course of Sanskrit studies.—Bopp's Grammar; Practical Exercises. Selections from the Hitopadesa; from the Mahabharata, and other Sanskrit works. Also occasionally, lectures on Sanskrit Literature, and on special subjects connected with Sanskrit Philology.

The Hebrew, Chaldee and Ancient Syriac are taught by Professor Wilson whenever there are classes desiring them.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the students the principles of grammar and the use of idioms, with a knowledge of pronunciation, so that, at the end of the course, each of them may be able to read any modern work, and to write with some degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term Otto's "French Grammar" is studied. This is completed in the second term, and translation is begun, and is continued through the third term. In the second year French plays are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar, "Il Vero Amico," comedy of Goldoni, and Manzoni's "Promessi Sposi."

Second Year.—Dante's "Inferno," selected stories from Boccaccio's "Decameron," and lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar in connection with exercises in writing; Padre Isla's translation of Le Sage's "Gil Blas," and Moratin's "El Si de las Niñas."

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year,*—(Second year in the Course in Science). Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. After the second year of German or the third year in the Course of Science, German is optional.

Third Year.—The reading consists of the first part of Goethe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyeson's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

VII. MATHEMATICS AND ASTRONOMY.

In this department there are two courses marked out, one or the

other of which is pursued wholly or in part by every student who is expecting to graduate in any course except Natural History.

The fuller course is designed especially for students in Architecture, Civil and Mechanical Engineering, and those whose professional pursuits are to be largely dependent on Mathematics. It is also designed to meet the wants of those who take the technical course in Mathematics or pursue the subject with special reference to preparing themselves for teachers.

The other course is designed for those who do not intend to pursue the subject any further than is required in the General Courses and in the Courses of Agriculture, and Chemistry and Physics.

FIRST OR FULLER COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Theory of equations and spherical trigonometry. *Third Term.*—Harmonoid geometry and geometrical conics.

SECOND YEAR.—*First Term.*—Analytical geometry. *Second Term.*—Analytical geometry of three dimensions and calculus begun. *Third Term.*—Calculus.

THIRD YEAR.—*First Term.*—Integral calculus. *Second Term.*—Theory of functions and calculus of variations. *Third Term.*—Differential equations.

FOURTH YEAR.—*First Term.*—Analytic and celestial mechanics. *Second and Third Terms.*—Philosophy of mathematics with reviews.

SECOND COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Solid geometry. *Third Term.*—Trigonometry and mensuration.

SECOND YEAR.—*First Term.*—Analytic geometry, plane and solid. *Second Term.*—Calculus and astronomy.

The whole of the first course is required in the Technical Course of Mathematics. It is required through the third term of the calculus ending with the first term of the third year in the Course of Civil and Mechanical Engineering, and through the second term of calculus ending with the third term of the Sophomore year, except the harmonoid geometry, in Architecture.

Any student in any of the courses who chooses to do so may take the mathematics of this course with the permission of the professor in charge of the department.

For post-graduates and special students other subjects are offered if they are desired, as quaternions, quantics and the theory of numbers.

In the latter portions of the fuller course and for post-graduate studies French and German text-books will be used.

Descriptive astronomy will form a part of each course.

Throughout the course in mathematics and in all the mathematical classes there will be frequent examinations during the term, besides the general term examination at the end of each term. These will often be given without notice, and extend to previous work. They will test the student's mastery of general principles and methods, quite as much as of details.

VIII. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial and Practical Mechanics were early established and filled. Models illustrating mechanical movements, and the various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the endowment of the Professorship of Mechanical Engineering and Machine Construction. This department has thus been placed in a condition to do its work in a most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine-shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

The instruction in shop-practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine-shops. The work consists in the production of standard tools of the highest excellence, and the building of machines from original designs. With the exception of the standard surface-

plates, gauges, etc., which are only produced to give the students a knowledge of flat, straight, square, and round, together with the correct methods of producing them, there is no one thing or class of things manufactured.

The work is always changing, and the relative kinds of work are proportional to that required in the production of new machinery. By this method it is believed that the students will learn not only the use of tools, but acquire experience also in the development of new designs.

In addition to the Full Course of four years which is given at length, under the heading "Courses of Study," an Optional Course has been laid out, subject to the direction of the Dean. For admission to this course entrance examinations in Grammar, Geography, Arithmetic, Algebra through Quadratics, Physiology, and Plane Geometry are required.

Attendance upon ten lectures or recitations per week, or their equivalent, in addition to two hours' daily shop-practice, two hours' daily drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

MILITARY SCIENCE.

By the Act of Congress creating the Land Grant on which the University is founded, and by the Act of the Legislature of the State of New York assigning that land grant to us, it is obligatory on the University to provide for instruction in Tactics and Military Science. In accordance with this, Drill and Military Science have been declared to be "a part of the studies and exercises in all courses of study and in the requirements of all students in the University."

The Course of Military Instruction and Drill, now prescribed. extends through the first and third terms of the first, second, and third years in the University, and the second term of the fourth year.

These exercises occur not more than three times a week during the first three years, and do not exceed one hour at a time. During the second term of the fourth year they occur but twice a week, and consist mostly of recitations and lectures in reference to the organization and command of a company and battalion.

The Trustees by a resolution of April 23d, 1875, authorized and instructed the Faculty to make such arrangements that any student may substitute other studies and exercises for the Drill and Military Science thus generally required of him.

Under this resolution the Faculty have decided that two recitations a week, or their equivalent in lectures, laboratory work, or other special work in any of the technical courses, for the students of those courses respectively, shall be regarded as an equivalent for the Drill and Military Science for the terms during which they are due.

In order that any student may avail himself of this permission

to substitute something else for the Drill and Military Exercises. it will be necessary that, at the time of obtaining his registration ticket for the term, he shall signify to the Registrar what he intends to offer as a substitute. If he neglects to do so he will be holden to the performance of his military duties for the term.

All students just entering upon the first term of the first year of their course are especially advised to take the Drill instead of offering any substitute for it. The fifteen recitations per week required of them are of such a character that most students find it as much as they can well do to prepare themselves for, and attend to them, while the Drill, requiring no extra study, will be no more than the amount of mere physical exercise which each student will find it necessary to take in some form or other. The practical military exercises are so ordered as to subserve the purposes of physical culture—an object of vital moment during the critical period of life usually comprised within university years.

All students that take Drill must continue it through the term. They are required to provide themselves after the first term of the first year with the University uniform for drill and parade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe, according to the nature of the case.

The Military Exercises include:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable. (3.)*Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Any student who has satisfactorily performed all the duties thus required of him for the first three years, and who is qualified therefor, will be entitled to a commission, and for the performance of his duties as a commissioned officer during his fourth year he will be entitled to a credit of five recitations per week for one term and, at his graduation, will receive, moreover, a certificate of military proficiency together with his appropriate Diploma,

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field

works; military mining; the attack and defense of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

X. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will afford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

I. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany: field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of systematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the princi-

ples involved in the natural system of classification. The prominent species of each order are also considered, especially those of importance as agricultural, medical, economic, or ornamental plants, or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany.

The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany.

In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required.

In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

2. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

In this school a full course may be completed in the last six terms of the course in Natural History; but as this is designed especially for those intending to become professional geologists, ample provision has also been made for the needs of others by the establishment of shorter courses, both special and general.

The instruction given may be classified under three heads:

I. *Geology proper.*—Comprises the principles of general and theoretical geology, including physiography, geognosy, dynamical geology, stratigraphy and archæology. These subjects are taught by means of (1) a course of lectures in the spring term; (2) laboratory practice, consisting in the critical examination of rocks, the study and construction of geological maps, sections, models, etc., and the preparation of short theses upon special topics; (3) field practice, including also the methods of procedure in geological surveys and reconnoissances.

II. *Palæontology.*—In this department, a course of lectures on palæo-zoology is given to special students, in connection with

the study of fossils in the laboratory. Palæo-botany is also taught in a similar manner, the whole being supplemented by the thorough study of historical geology. Field work is required of all students, as in the other branches of the school.

III. *Economic Geology.*—Comprises the distribution and modes of occurrence of mineral deposits; the geological positions and relations of building stones, fictile materials, fossil fuels, light-producers, pigments and other natural accumulations applicable in the arts, as well as the relations of practical geology to agriculture, architecture, civil and mining engineering, sanitary science, etc. These topics are included in a course of lectures given in the winter term, and in the laboratory, special facilities are afforded for further progress to such persons as may desire it. In this way, engineers, architects, physicians and agriculturists may obtain a knowledge of the subject suited to their particular needs.

The lectures are designed to present outline views of the subjects treated, such as will serve as an introduction to higher geological studies, and afford a general idea of the science to those who have not the opportunity of extending their knowledge of it.

In the laboratory, the student is required to investigate for himself, without access to books until he is prepared to use them in the final stages of his studies. Work is systematically laid out by the teacher at each step, and the rate of progress is determined by the ability and faithfulness of the student.

Whenever practicable, extended excursions are made with the classes, and local field work is frequent in suitable weather.

Professor Comstock is now engaged in a geological survey of the hydrographic basin of Cayuga Lake, a district which presents problems of the highest interest in physical geology. Qualified students will assist in this undertaking, receiving full credit for their work.

Courses of study and practice for post-graduate students provide for advanced work in geology or palæontology to any extent that may be desired. The surface geology of this region is remarkable and the rocks of the vicinity are exceedingly rich in fossils of the Devonian age.

3. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3) A course of thirty-five lectures on psychology and æsthetics, by Professor Wilson. In the Winter Term, (1) A course of thirty lectures on general zoology, by Professor Wilder, and (2) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3) A course of fifty lectures upon veterinary medicine

and surgery, by Professor Law. In the Spring Term, (1.) A course of twenty lectures upon comparative anatomy, by Professor Wilder. (2.) A course on economic entomology, by Instructor Comstock. (3.) Lectures on the natural history of man, forming a part of a course in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians are required to dissect, first, the common animals, then monkeys, and afterward human subjects, when they can be procured. Special attention is given to the animals inhabiting Cayuga Lake and the vicinity of Ithaca. Instruction is given in the methods of collecting, preserving and arranging anatomical and zoological specimens.

Books of Reference.—Students are at liberty to select from the following list of works for reading upon the subjects treated of in the lectures:—Flint's "Physiology of Man;" Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's "Physiology and Hygiene." In comparative anatomy—Owen, Huxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies—Wyman ("Symmetry and Homology in Limbs"), Wilder ("Intermembral Homologies.") In zoology—Agassiz ("Essay on Classification," or "Methods of Study in Natural History"), with Tenney ("Manual of Zoology") or Milne-Edwards ("Elements of Zoology"). In economic entomology and ornithology—Packard, Samuels, the New York State Reports, and Riley's Reports on Entomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily pursued a partial or special course, there will be given a certificate, stating the time he has spent, the studies pursued, and his degree of excellence therein. It will be signed by the President of the University and the Dean of the Faculty. A student who has completed the full course of four years, will be recommended for the degree of BACHELOR OF SCIENCE.

XI. PHILOSOPHY AND LETTERS.

I. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge.

Spring Term.— Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

FOURTH YEAR.—*First Term.*—The History of Philosophy, and the progress of knowledge from its beginning in Greece to the

present day, with criticisms on the methods of philosophy and transcendental logic.

Second Term.—Moral philosophy theories or morals and the development of moral sentiments. For the present Moral Philosophy and Political Economy alternate with each other, each subject being treated only once in two years. The Junior and Senior classes are united in their attendance on these lectures.

During the Winter term of the Senior year there is also a course of lectures on the Philosophy of History. And in the third term of that year a course of lectures is delivered on Law and Jurisprudence, including the three branches, Constitutional, International, and Municipal Law.

2. SCHOOL OF LETTERS.

The study of the English language and literature, including the explanation and illustration of the structure, growth and peculiarities of the language, is incorporated into each of the General Courses.

The School embraces two departments, one of Anglo-Saxon and English Literature, and the other of Rhetoric and General Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, and embraces the following schedule of exercises and lectures:—

In the course in Science:—

No instructions are given by the Professor in this department, until the beginning of the third year.

THIRD YEAR.—*First Term.*—Lectures on the English language and literature, from Chaucer to Milton, inclusive. *Second Term.* —Lectures on the English language and literature, from Dryden to Cowper, inclusive. *Third Term.*—Lectures on English and American literature of the nineteenth century. A Syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric. *Third Term.*—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum,

Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

II. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and for the first year the instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

During the second year the exercises in writing and composition are continued; the subjects varying with the advance of the student.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; to extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also have exercises in lecturing on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR.—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

SECOND YEAR.—Essays with readings in the class and criticism of composition and style.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions ; readings from Shakespeare and Burke. *Second Term.* —Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose ; orations, essays, and discussions.

Letters of inquiry for further information in regard to special departments of the University may be addressed to the head of the department concerning which the inquiry is made.

MEANS AND FACILITIES FOR EDUCATION.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls are devoted to lecture-rooms. The other halls contain rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING, are the offices of the President, the Treasurer, and the Registrar of the University, and the Faculty Room.

In the NORTH BUILDING is the Hall of the University Literary Societies, where the Young Men's Christian Association also hold their meetings. It contains, moreover, fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE MC GRAW BUILDING.

This building, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone, quarried on the University grounds, but with dressings and cornices of Onondaga gray limestone. In its architecture it corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter containing three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and in the galleries on the second floor are the various museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath

this are the rooms at present occupied by the Department of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University, the nine smaller bells of the McGraw chimes and the great University clock. The interior of the McGraw building is solidly finished with native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professor of Industrial Mechanics, and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE FOR WOMEN.

This is the gift of Honorable Henry W. Sage. It is not a separate department or school, but merely a home or dormitory for women students. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will

accommodate about one hundred pupils. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE SAGE CHAPEL.

This Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require. The discourses spoken of above—under the head of religious instruction, are delivered in this Chapel; and the Daily Morning Prayers of the University are also held here.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above the town. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream; and enter the University campus on the south side.

II. LABORATORIES.

1. THE ANATOMICAL LABORATORY.

The Anatomical Laboratory is in the second story of the McGraw building, adjoining the Museum and lecture-room. In the laboratory are all of the alcoholic collections. Among these are specimens and dissections of the *fishes of Cayuga Lake;* a series of *embryos*, especially of mammals; a series of *brains* of all classes of vertebrates; Brazilian fishes, reptiles and mammals. A large lot of *amphioxus* has lately been received from Italy, and each special student will be enabled to dissect one or more specimens of this, the lowest known vertebrate animal.

2. THE CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in GENERAL Chemistry, and a smaller one for the class in AGRICULTURAL Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors, and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunson filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

3. THE ENTOMOLOGICAL LABORATORY.

The Entomological Laboratory is in the McGraw Building and on the same floor as the Anatomical Laboratory. In it is the collection in Entomology, and the work in this Laboratory is under the guidance of a special instructor. Among its collections are a series illustrating the entire life-history of injurious insects, their transformation, food, parasites, etc.

4. THE GEOLOGICAL LABORATORY.

The Geological Laboratory is in the south wing of the McGraw Building, second story, adjacent to the Geological Museum. It is furnished with tables and means for laboratory work, a very complete collection of specimens and books for reference; there are also a large number of photographs, illustrating geological phenomena, from the Hayden expedition and the Pacific Coast surveys, and other sources.

5. THE MECHANICAL LABORATORY.

The Mechanical Laboratory, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, and a grinding

machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard guages in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam-engine in case of accident to the water power.

6. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but good practical provision for this work has been made. The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illustrative experiments. Several rooms in the South Building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarized light, and photometry. In the Chemical Laboratory Building, a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern-slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Dubosoq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet and a Gramme electro-magnetic machine, made at the University work-shop.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

7. THE DRAUGHTING ROOMS.

There are four Draughting Rooms, fitted up with tables, models, and whatever is needed for the work to be done in them. (1.) The Architectural Draughting Room, in the north wing of the McGraw Building, under the direction of Professor Babcock. (2.) The Engineering Draughting Room, in the north wing of the Chemical Building, under the direction of Professor Fuertes. (3.) The Mechanical Draughting Room, in the Sibley College, under the direction of Professor Morris. (4.) The Free-hand Drawing Room, occupying the third story of the Sibley College, under the direction of Assistant Professor Cleaves.

8. THE GENERAL FARM.

The University farm consists of about 100 acres, exclusive of the experimental farm, the campus, and timber land. A large proportion of this is devoted to the raising of food for the domestic animals. In addition to the animals kept for labor and the production of milk, are a few specimens of the leading breeds of cattle, sheep, and swine, the primary object of which, is class illustration. The object of the system pursued consists in raising to the highest standard the condition of the soil and its productive power. But it is evident that this can be accomplished only by a well defined system of rotation, and years of careful and judicious management.

It is further evident that the high price of labor and of fertilizers are the principal obstacles to be overcome in advanced agriculture. By the more extended use of labor-saving implements and the horse in the operations now so often performed by hand, supplemented by the liberal application of fertilizers and clover, we are sanguine that it may be conducted within the limits of economical labor. The general farm is made supplementary to the experimental, by duplicating the experiments of the latter but on a larger scale.

The statistics of the general farm as well as the experiments are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

The old barns near the University buildings have been repaired and adapted to general farm purposes. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and illustration the best tools of their kind that the market affords.

9. THE EXPERIMENTAL FARM.

Forty acres of the general farm are used in conducting experiments in the rotation of crops, the various modes of cultivation, the value and application of domestic and imported fertilizers, the hardiness, productiveness, and value of the various grains and grasses, and in originating and testing new varieties. To aid in conducting these experiments, a new and commodious barn has been erected, and adapted for that purpose; it will aid for experimentation in feeding domestic animals. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five thousand square feet, is divided into box-feeding stalls, sheep pen,

horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

III. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work and in various languages. From it have been issued the UNIVERSITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

The facilities of the printing office have been increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting, will be provided with work and the means of further instruction.

IV. THE UNIVERSITY LIBRARY.

The University Library contains about forty thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRA-

RY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelley, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible; the first one—Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

V. THE READING ROOM.

The Library is open and accessible to all registered students every week day from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:—

American.—American Journal of Science; Atlantic Monthly, Canadian Monthly; Country Gentleman; The Nation; Monthly Report of the Department of Agriculture; New York Medical Jour-

nal; North American Review; Harper's Magazine; Historical Magazine; Horticulturist; Journal of the Franklin Institute; Official Gazette of the Patent Office; Prairie Farmer; Railroad Gazette; Railway Review; Specifications of Patents; American Bibliopolist; Cornell Review; Journal of the Telegraph; Journal of Social Science; Medical Eclectic; Penn Monthly; Popular Science Monthly; Publisher's Weekly; Unitarian Review.

English.—Academy; Anthropological Review; Athenæum; Blackwood's Magazine; Bookseller; Builder; Chemical News; Edinburgh Review; Engineer; Examiner; Frazer's Magazine; Guardian; Illustrated News; Journal of the Geological Society; Journal of Microscopical Science; Journal of the Royal Agricultural Society; Mechanics' Magazine; North British Review; Notes and Queries; Pharmaceutical Journal; Philological Society's Proceedings; Popular Science Review; Quarterly Journal of Science; Quarterly Review; Saturday Review; Spectator; Veterinarian; Westminster Review.

French.—Annales de Chimie; Annales des Mines; Annales des Ponts and Chausées; Bibliographie de la France; Bulletin du Bibliophile; Bulletin de la Société chimique; Comtes Rendus; Illustration; Journal de l'Agriculture; Journal de l'Anatomie; Journal de Mathématique; Journal de Menuisérie; Nouvelles Annales de Mathématique; Recueil de Médecine Vétérinaire; Revue des deux Mondes; Revue de l'Architecture; Revue politique et littéraire; Revue scientifique; Revue de Zoölogie.

German.—Annalen der Chemie und Pharmacie; Annalen der Physik; Archäologische Zeitung; Archiv für Anatomie; Archiv für das Studium der neuren Sprachen; Chemisches Centralblatt; Fortschritt der Physik; Hermes; Historische Zeitschrift; Illustrirte Zeitung; Im neuen Reich; Archiv für mikroskopische Anatomie; Archiv für pathologische Anatomie; Bauzeitung; Beiträge für Sprachforschung; Bericht der deutschen Chemischen Gesellschaft; Literarischer Wochenbericht; Milch Zeitung; Palæontographica; Petermann's Mittheilungen; Philologus; Polytechnisches Journal; Jahrbuch für wissenschaftliche Botanik; Jahresbericht für Chemie; Journal für praktische Chemie; Journal für Mathematik; Landwirthschaftliche Versuchs-Stationen; Landwirthschaftliches Centralblatt; Literarisches Centralblatt; Repertorium der Thierheilkunde; Repertorium für Experimental Physik; Rheinisches Museum; Zeitschrift der morgenländischen Gesellschaft; Zeitschrift für analytische Chemie; Zeitschrift für bildende Kunst; Zeitschrift für Sprachforschung; Germania vierteljahrsschrift für deutsche Alterthumskunde; Jahrbuch für Romanische und Englishe Sprache und Literatur; Jahresbericht über die Fortschritte der classischen Alterthumswissenschaft; Journal für die reine und angewandte Mathematik; Mittheilungen über wichtige neue Erforchungen; Zeitschrift für Bauwesen; Zeitschrift für Volkerpsychologie.

VI. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Frères Chrétien, of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern-slides to be used in the camera as illustrating various remarkable buildings and the various styles of architecture.

The architectural department in the University Library is particularly full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modèles Clastiques* of plants, on a magnified scale, by Auzoux, of Paris, and plant models designed and executed by Brendel, of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil

by Professors Prentiss and Hartt and Mr. Derby; (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh; (5) A small collection of economic vegetable products.

4. GEOLOGY AND PALÆONTOLOGY.

This Museum comprises:—(1) The JEWETT COLLECTION, embracing a large number of species of fossils, mainly from the New York formations, many of which are illustrated by type-specimens figured and described in the reports of the New York State Geological Survey; (2) A series of rocks and fossils of the Devonian Age to illustrate the geology of Ithaca and vicinity; (3) The HARTT COLLECTION (deposited) of rocks and fossils from the British Provinces and Brazil; (4) The collections of rocks and fossils made by Professor Hartt and his parties on the two Morgan expeditions to the Amazonas in 1870 and 1871; (5) The WARD COLLECTION of casts of fossils, presented by Mr. Cornell; (6) Several miscellaneous collections of ores, rocks and fossils obtained through gift, purchase or exchange; (7) A collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard on the Amazonas in 1870 and 1871; (8) A number of skeletons from the Anglo-Saxon Cemetery at Frilford, England, with a variety of ethnological relics from the same place, the whole presented by Professor George Rolleston, of the University of Oxford; (9) A valuable collection of ancient Peruvian pottery, presented to the Museum by President White; (10) The T. B. COMSTOCK COLLECTION (deposited), of rocks, fossils and minerals, including a quantity of hot spring and geyser deposits from the Yellowstone National Park, with volcanic rocks and other material collected by Professor Comstock, while acting as the geologist of the N. W. Wyoming expedition, in 1873; (11) The SIMONDS COLLECTION (deposited), made up of fossils from the Cayuga Lake Basin, especially from the Hamilton and Chemung groups, and containing many forms as yet undescribed; (12) Several hundred lantern-slides to illustrate the lectures on geology, palæontology and archæology; (13) A number of large photographs illustrating the geology, etc., of the Rocky Mountains and the Pacific Coast, taken on the Hayden Survey and the U. S. Coast Survey; (14) The W. A. JONES COLLECTION (deposited), comprising a choice selection of fossils and minerals from N. W. Wyoming and elsewhere, collected by Captain Jones of the U. S. Engineer corps.

5. MINERALOGY.

The SILLIMAN COLLECTION of minerals, formerly the private collection of the late Benjamin Silliman, is located in the main hall of the McGraw building and contains many valuable specimens. There is also a small but constantly increasing working collection

of minerals situated in the Chemical Laboratory which is used more especially by the students in determinative mineralogy and blow-pipe analysis.

6. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art at the present time, as well as a collection of curious things pertaining to the department, is being made and will comprise arms of various patterns, shot, shell, and the various kinds of ammunition in use in the army of the United States. It is believed that the student being familiarized with the different articles and their nomenclature, will be enabled to comprehend much better the technical statements of military history; and if his services are required by the national government this information will be of advantage.

7. TECHNOLOGY.

Besides the models made at the University, the Museum of Technology and Civil Engineering comprises:—(1) A collection of working models in brass and iron, illustrative of mechanical principles applied to machinery, and an extended series of photographs for the same purpose, from the establishment of Schröder, of Darmstadt; (2) Another collection of working models in wood and iron, illustrative of intricate mechanical combinations and expedients, made under the direction of Professor Willis, of Cambridge, England, and Professor Rigg, of the College of Mechanics, at Chester; (3) Models illustrative of descriptive geometry, and bridge and roof construction, made by Schröder; (4) The diagrams and charts issued with the sanction of the English Committee of Council on Education; (5) Photographs and models from various sources; (6) A collection of engineering instruments.

8. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoology, which are available for the educational purposes of the University, are made up of the following:—(1) THE GREENE SMITH ORNITHOLOGICAL CABINET, a mounted and classified collection of 362 birds, principally American, made and presented to the University by Mr. Greene Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL COLLECTION, including about twenty-five thousand species; (3) The *Modèles Clastiques* of Dr. Auzoux, of Paris, illustrative of comparative anatomy and physiology; (4) The lithographic charts and diagrams edited by Achille Comte of Paris, and those published under the auspices of the Council of Education at London; (5) A constantly increasing collection of native animals in alcohol, and of preparations illustrating their structure; (6) A collection of insects to which additions are constantly made, specially intended

to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoological specimens deposited by Professors Wilder and Hartt.

VII. COLLECTIONS IN THE FINE ARTS.

The foundation of a Museum of the Fine Arts has heen laid by depositing in the University, for the use of the Faculty and undergraduates, the following: (1) A valuable collection of Photographs, especially rich in illustrations of architecture and of art applied to manufactures; (2) Paintings in oil, including full length portraits of Professor Goldwin Smith and George William Curtis, by Carpenter, presented by President White; with portraits of Humboldt, Hon. Hiram Sibley, Peter Cooper, and Prudence Crandall; (3) Bronze copies of masterpieces of statuary, including three of Michael Angelo's works, two busts by Burton, one of President White, a gift of some friends of the President, and the other of Professor Wilson, a gift of the Students of the University, a bust of Vice-President Russell by Miss Abbot, and an original bust of Lincoln; (4) Many portfolios of engravings illustrative of Christian art, and of the history of art in general, including the publications of the Arundel Society and the Berlin Museum series, as well as the series of heliotype reproductions of the Gray collection.

There is also quite a collection of busts of distinguished men of Classic, Gothic, Renaissance and Modern Sculpture, and architectural ornamentation, made under the direction of the South Kensington Museum, and by Brucciana of London, arranged for the use of students in Free-hand Drawing, and for the departments of Architecture and Engineering.

VIII. UNDERGRADUATE SOCIETIES.

The following associations have been formed by the undergraduates:—(1) A Natural History Society; (2) A Chemical Club; (3) An Agricultural Club; (4) An Engineering Club; (5) A Society for Mechanical Engineering; (6) Four literary societies, known as the "Irving," the "Philaletheian," the "Adelphi," and the "Curtis;" and (7) a "Christian Association," meeting Thursday evenings and on Sunday afternoons.

ADMISSION AND GRADUATION.

ENTRANCE EXAMINATIONS.

Candidates for admission must be of good moral character and at least sixteen years of age, and if women, seventeen.

1. All Optional students, and students for the Courses in Agriculture and the Mechanic Arts will be required to pass thoroughly satisfactory examinations in the following subjects:—(1) Geography, political and physical. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic, including the metric system. (4) Physiology. (5) Plane Geometry, and (6) Algebra through Quadratic Equations including Radicals.

Regents' certificates issued by the Regents of the State of New York will be accepted instead of entrance examinations in Arithmetic, Geography and English Grammar.

Certificates issued by the Superintendent of Public Instruction of the State of New York, and certificates of having passed satisfactory examinations at any of the normal schools, academies or high schools of the State of New York, whose requirements for graduation meet the approval of the Faculty, in Arithmetic, Grammar, Geography, Physiology and Plane Geometry, will be accepted in the case of students who have graduated in such schools, instead of an entrance examination in the studies above named.

2. For admission to the courses in Architecture, Civil Engineering and Mathematics, besides what is mentioned above, an examination will be required in Solid Geometry, and Plane Trigonometry (those books preferred in which the trigonometric functions are treated as ratios), including the theory and use of Logarithms.

3. Of all candidates for admission to the courses in Science, Science and Letters, Literature, Philosophy, Mathematics, Natural History, and Chemistry and Physics, examinations will be required, besides those named in the first paragraph above, either (1) in the principles of French Grammar and Construction, and the first book of Voltaire's Charles XII, or its equivalent; or (2) the principles of German Grammar and Construction (Whitney's or Com-

fort's Grammar preferred), and seventy-five pages of Whitney's Reader, or its equivalent; or (except for the course in Mathematics), (3) Algebra entire (*any of the larger ones*), Solid Geometry, and Trigonometry, Plain and Spherical.

4. For the Course in Natural History, candidates will be examined also in Plane Trigonometry; Allen's Latin Reader, or some equivalent for it, with an adequate amount of grammatical knowledge; and in Greek, the alphabet and enough of the language to enable the student to recognize, analyze and form scientific technical terms.

5. For the Course in Literature and that in Philosophy, besides the general entrance examinations and the French or German, they will be examined in Latin Grammar, including prosody; Composition (Arnold's first twelve chapters); four books of Cæsar or Sallust's Cataline, eight Orations of Cicero, or five Orations and the *de Senectute*, Virgil's Eclogues, Georgics, and six books of the Æneid.

6. For the Course in Arts, or the Classical Course, the examinations will be the same as for Optional Students, Latin the same as for the Course in Literature, with the addition of an examination in Greek; Greek Grammar (Goodwin's); writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; and the History of Greece.

7. Special Students will be admitted to the University without examination, to any of the Departments in which either laboratory work or drafting is required, by a vote of the Faculty, on the recommendation of the Professor in charge of the Department. Such students must be at least eighteen years of age, and must have some attainments in the subject they propose to pursue; they must devote at least fifteen hours a week to the work of the Department which they have entered, and must renew their application for admission to the Department at the end of each year.

NATURE OF THE EXAMINATIONS.

Some idea of the character of the Entrance Examinations may be derived from the specimens of examination papers given below. They are in all cases papers that have actually been given to classes when examined for admission, and are but fair samples of what will be given hereafter. And although perfect answers to all the questions are not indispensable, yet a near approach to perfection is required in all cases.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities, must present certificates of honorable dismission, after hav-

ing passed at least one term's examinations. They will, on such a testimonial, be admitted to the University without further examinations. The testimonial must certify to both good character and good scholarship. Such a testimonial will merely admit the bearer to the University; it will not admit him to any particular advanced standing. On this admission he will be allowed to join any class in any study that requires no previous preparation except the general preparation for admission to the University, as for example, French with the Freshman class, German with the Sophomore.

But if the student desires to join any class in Latin, Greek, advanced French or German, or Mathematics, he must apply to the professor in charge of the department, and undergo such examination as he may require in order to satisfy himself of the student's ability to go on with the class.

Students coming from other colleges or universities, are ***in no case*** admitted at ***once*** to any advanced standing as Sophomore, Junior or Senior. The class distinctions indicated by those names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of this University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need to prepare themselves for graduation here, without regard to the class distinctions above alluded to.

After having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, such students may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to,—the Faculty by this act accepting their studies elsewhere as equivalent to what they would have done here if they had entered the University at the beginning of their collegiate course.

DIRECTIONS FOR ADMISSION.

The candidate will first apply to the Registrar, at South University Building.

1. In case he comes from another college or university, with the "Dismissal" above described, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

2. But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations.

The Entrance Examinations will be held on the days indicated in the calendar on the 7th page of the Register.

For all examinations, except that in June, beginning the Monday before Commencement, the appointments are as follows:

On Tuesday, beginning at 10 o'clock, a. m., arithemetic, algebra and plane geometry, with a recess from 1 to 2.30 p. m.

On Wednesday, physiology 8 a. m., geography 10 a. m., English grammar and orthography 2.30 p. m.

On Thursday, 9 a. m., French, German, Greek and solid geometry; 2.30 p. m., Latin and plane trigonometry.

No examinations for the admission of students will be held after those at the beginning of the second term until those in June, just before Commencement, which will begin on Monday, 10 a. m.

Candidates for admission should be here on the day set and at the hour named for the beginning of the examinations, as each examination is complete by itself, and will not be repeated until the beginning of the next term, except in cases where very urgent reasons have prevented the student being present at the regular entrance examinations.

After his examination he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing all the examinations required, and showing to the professor his registration ticket.

In case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examinations, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *No optional or other course will be possible* without some advance beyond the mere entrance examination.

ADMISSION TO AN ADVANCED STANDING.

Students who have prepared themselves for an advanced standing in the University, at academies or public schools, not having entered any other college or university, will be required to pass the entrance examinations. After that they will be in the same relation to their classes as those that have come from other colleges. They will be admitted at first as optional students, and will afterwards pass the examinations for the standing they seek, at the times appointed by the several professors whose classes they propose to enter.

These examinations are required for two classes of cases:

(1.) Students, who desire to join an advanced class in any Department, as Mathematics, French, German, without intending to graduate, are required, before joining such class, to pass an examination in the studies that have been pursued by that class, in order to test their ability to go on with it.

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(2) Students *intending to graduate* in any course will be required to pass an examination, with the classes in the University, in those studies of the course which they may have pursued elsewhere.

Students who fail at any examination must take the study over again; those who are conditioned must make up their condition at the first ensuing examination on the same subject, and any professor may exclude from his class any student who, after having had one opportunity to do so, shall have failed to remove his condition.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate degree in this University, or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular professor or special faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

A schedule of the lectures and exercises for each term is issued at the beginning of the term.

The day next preceding that on which instruction begins is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

The beginning and end of all lectures and recitations are determined by the ringing of the great bell in the McGraw tower. Lectures and class exercises commence at 8 A. M. and continue until 1 P. M. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term, To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

Reports of all examinations are made and a record of them is kept by the Registrar. A Course Book also has been provided which the students may procure and in which they may have an entry made, term by term, indicating the grade at which they passed their examination. Any student may ascertain on making application to the Registrar whether he has passed his examinations or not.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is required for continuance in the University, or a marked proficiency in some one of the more general departments of study, And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one or more terms in the University as a registered student, taking such studies as the Faculty may require. And all Diplomas will be dated from the time when they are granted.

COMMENCEMENT THESES.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere boys, assuming no farther control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory

practice, each week, and for the term in which Drill is required, either the Drill or two hours of extra study, and that no student is allowed to take an optional course that is not approved by the Faculty as worthy of his time and efforts.

Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without leave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty.

Any student found guilty of intoxication or other gross immorality will be at once dismissed.

And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to re-enter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred on all those students who satisfactorily complete any one of the five courses: Science, Science and Letters, Chemistry and Physics, Mathematics, or Natural History. And the particular course pursued by the student is specified in the Diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are given to the students who satisfactorily complete the courses corresponding to the degree named. The degree of Bachelor of Veternary Science is also given to students who complete a full course of four years in that department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the course leading to it in precisely the same order as it is laid down in the statement of courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register. But very few of those who attempt an optional course succeed in graduating in any course.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are offered.

A fee of five dollars is charged in all cases for Baccalaureate degrees, which must be paid before the diploma will be given.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out in the following General Departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any student intending to take a second or advanced degree should apply to the Faculty to be admitted a candidate for the degree he wishes to take, and signify the department in which he wishes to prepare himself for the degree.

MASTER'S Degrees in Arts, Literature and Science, will be conferred on those who have taken the Bachelor's degree in this University or elsewhere, where the requirements for those degrees respectively are equal to our own, on the following conditions:

1. After having spent at least one year in this University in a course of post-graduate study marked out by the Faculty in each case, presented a satisfactory thesis and passed a satisfactory examination at the University in the course of study pursued.

2. The same degrees will be conferred without residence on graduates of this University only, on conditions the same in all respects as above, except that the degree will not be given until three years after the Baccalaureate Degree has been taken.

The degree of MASTER OF SCIENCE will be conferred on those who have graduated in the Course in Philosophy on the same conditions as upon those who have graduated in the Course in Science.

The degree of CIVIL ENGINEERING is conferred upon such Bachelors of Civil Engineering as, after six terms or two years of additional study and practice, shall have passed the requisite examinations in the School of Engineering.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of Bachelor of Veterinary Science and who shall have passed satisfactory examinations therefor.

The degree of DOCTOR OF PHILOSOPHY will be conferred on graduates of this University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to our own on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required here for graduation in the Course in Philosophy, a knowledge of Greek equal to that required here for admission to the Course in Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

3. He must pass an examination upon the course marked ou. and present a meritorious thesis upon some subject included in the course of study.

The degree of DOCTOR OF SCIENCE will be conferred on graduates of this University, and other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have

(*a*) A knowledge of Latin and Greek at least equal to that now required for admission here to the Course in Natural History.

(*b*) A knowledge of French and German equal to that required here for graduation in the Course in Science.

(*c*) A knowledge of science, of literature and of philosophy equal to that required here for graduation in the Course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Every successful candidate for any advanced degree will be required to pay to the Treasurer ten dollars before receiving his diploma.

They will also be required, in the case of the Doctor's degrees, to print their theses and deposit fifty copies in the Library of the University before receiving their diplomas.

In all other cases of second degrees the successful candidate will be required to deposit a copy of his thesis in the University Library.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Candidates for any second degree are required to make their applications for examination and present their theses at least twenty days before the annual Commencement at which they propose to take their degree.

A committee consisting of four members of the Faculty will superintend the examinations, which will take place during the second week previous to Commencement week.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates or certificates of proficiency, are conferred upon students who have pursued a special course in any branch of knowledge. They are given upon the recommendation of the respective Faculties.

CERTIFICATE OF JOURNALISM.

Although no special course has been arranged in journalism, arrangements have been made for giving special instructions to those who intend to make journalism their profession. These arrangements consist, so far as the University is concerned, in

The art of printing. Students will be required to do work at type-setting in its various branches, the reading and correction of proofs, the making up and working off of forms, in the University printing-office, under the direction of the Director of the University Press, to such an extent that they will be able to take charge of an office and do book and job work by themselves.

Besides this, students will be required to study phonography, under an approved teacher, and to acquire some knowledge of telegraphy; and as neither of those subjects is taught in the University they must be acquired by the students outside of the University, and at their own expense.

To all students in either of the General Courses who shall have complied with the foregoing conditions there will be given, in addition to the Diploma appropriate to their course, a *Certificate of Journalism*, signed by the University authorities and the University seal affixed, as follows:

1. To all students in the Course in Literature, or in that in Philosophy, who shall have satisfactorily completed the course.

2. Of students in the Course in Arts it will be further required that they shall have taken at least one term in French and two in German in their course.

3. Of students who have completed the Course in Science it will be required that they shall have taken all the studies that are in that course in the departments of History, of Languages and of Philosophy and Letters, and shall have prepared themselves, *outside of the University course*, to pass, before the beginning of their fourth or Senior year, a satisfactory examination in Latin Grammar and some Latin Reader, sufficient to enable them to read and translate ordinary Latin Sentences.

PAYMENTS TO THE UNIVERSITY.

Free tuition is given:

1. To all State students appointed as described on p. 35.

2. To all resident graduates of this University and graduates of other colleges and universities whose requirements for graduation are equal to our own.

3. To agricultural students who are (1) pursuing either the three or the four years course and *intending to complete* the course; or, (2) to other students, *for two years only*, who take not less than ten hours of recitations per week in two or more of the following departments: (*a*) Agricultural Chemistry; (*b*) Veterinary Science (*c*) Practical Agriculture and Farm Work; (*d*) Botany, Horticulture, and Entomology as applied to Agriculture,

For all others the tuition fee is twenty-five dollars a term.

No matriculation or entrance fees are required; nor is any discrimination made between students coming from other States.

The fees for instruction must be paid in advance, at the beginning of each term.

All students are, moreover, held responsible for any injury done by them to the property of the Institution.

Each student intending to take laboratory practice in Chemistry must deposit with the Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

The following is an approximate estimate of the yearly expenses:—

Fees for instruction, $25 a term, - - - - -	$ 75.00
Room, board, lights and fuel, about - - - -	240.00
Total, - - - - - -	$315.00

Cascadilla Place, formerly kept by the University as a boarding-house for professors and students, is now rented to be kept for the same purpose. It is convenient to the University, and board with rooms, fuel, etc., can be had in it at an expense of from five five to seven dollars per week.

The Sage College is open as a dormitory and boarding-house for women students only. The cost for board, room rent, fuel and lights will be about $7.00 per week, to be paid in advance. Washing will be done in the building at the usual rates of charge for such work.

Other items will vary with the student's disposition and habits. Text-books and stationery cost from $20 to $30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

COURSES OF STUDY.

The Courses of Study, both General and Technical, are made up of the instruction already described under the title of "Scope of the Instruction" as given in the various departments and schools of the University, combined in different proportions and groupings, as will be seen below.

In the following statement of the several courses the figures in parentheses denote the number of exercises per week. The word "*or*" in italics between two or more studies denotes that they are equivalent for each other and that either of them may be taken at the option of the student.

In computing Laboratory Practice two hours and a half of actual work is regarded as equal to one recitation. And no student is received in any Laboratory for less than seven and a half hours of actual or the equivalent of three recitations per week, except in regular courses where a shorter time is specified.

In Drafting and Shop Work three hours of actual work are required as the equivalent of one recitation.

I. THE COURSE IN ARTS.

Leading to the degree of Bachelor of Arts.

[*Italics denote elective studies.*]

FIRST OR FRESHMAN YEAR.

First Term.—Greek (4); Latin (4); algebra (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Greek (4); Latin (4); solid geometry (5); rhetoric and composition (2).

Third Term.—Greek (4); Latin (4); trigonometry and mensuration (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Greek (4); Latin (4); exercises in rhetoric (1), *physiology, French, German, mathematics, experimental mechanics* (6).

Second Term.—Greek (4); Latin (4); exercises in rhetoric (1); *zoology, French, German, mathematics, chemistry, electricity and magnetism* (6).

Third Term.—Greek (4); Latin (4); exercises in rhetoric (1); *botany, modern languages, mathematics, electricity and magnetism* (6).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (3); essays (1); *Greek, Latin, modern languages, English literature, Roman history, mathematics, heat, geology* (11).

Second Term.—Political economy (2); essays (1); *Greek, Latin, modern languages, English literature, mathematics, astronomy, acoustics and optics, history of Roman empire* (12).

Third Term—Logic (3); essays and criticism (1): *Greek, Latin, modern languages, English literature, Mediæval history, mathematics, acoustics and optics* (11).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); general literature (3); *Greek, Latin, modern languages, pure mathematics, applied mathematics* (10).

Second Term.—Moral philosophy (2); general literature and modern oratory (3); *Greek, Latin, modern languages, special literature, history, pure mathematics, applied mathematics* (10).

Third Term.—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors: *Greek, Latin, history, modern languages, pure mathematics, applied mathematics* (10).

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

II. THE COURSE IN LITERATURE.

Leading to the degree of Bachelor of Literature.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); physiology (3); rhetoric

and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Geometry (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4); botany (3); Anglo-Saxon (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5) and French (3), *or* French (5) and German (3); Anglo-Saxon (3); Latin (4); exercises in rhetoric and composition (1).

Second Term.—German (5) and French (3), *or* French (5) and German (3); early English (3); Latin (4); exercises in rhetoric and composition (1).

Third Term.—German (5) and French (3), *or* French (5) and German (3); Latin (4); early English (2); rhetorical exercises and composition (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (4); Latin, modern languages, *or* science (6); special literature (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman Empire (4); Latin, modern languages *or* science (6); special literature (2); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history(4); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Second Term.—American history (2); philosophy of history (3); political economy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Third Term.—American law (5); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4); attendance on lectures of non-resident professors and preparation for Commencement.

Students who enter this course with an entrance examination in German will take elementary French and advanced German in the second year. And those who have French for their entrance examination will take elementary German and advanced French during that year.

III. COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); French *or* German (5); rhetoric and composition (2); six lectures on hygiene, to begin on the first Tuesday in October.

Second Term.—Geometry (5); Latin (4); French *or* German (5); rhetoric and composition (2).

Third Term.—Trigonometry (5); Latin (4); French *or* German (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—German *or* French (3); physiology (3); analytical geometry (5); experimental mechanics (3); exercises in rhetoric (1).

Second Term.—German *or* French (3); zoology (3); calculus *or* astronomy (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—German *or* French (3); botany (3); electricity and magnetism (2); chemical lectures (3); laboratory practice (3); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history, science *or* languages (4); chemistry (2); geology (3); heat (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman Empire, science *or* languages (6); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history, science *or* languages (6); acoustics and optics (3); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law (5); general literature and oratory (3); *optional* (5); attendance on lectures of non-resident professors and preparation for Commencement.

Students who enter this course will, after passing an entrance examination in French, take elementary German the first year and advanced French the second, and those who enter with a preparation in German will take elementary French the first year and advanced German the second.

IV. COURSES LEADING TO THE DEGREE OF BACHELOR OF SCIENCE.

1. THE COURSE IN SCIENCE.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Solid geometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); analytical geometry (5); experimental mechanics (3); rhetorical exercises (1).

Second Term.—French *or* German (3); zoology (3); calculus *or* astronomy (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—French *or* German (3); botany (3); electricity and magnetism (2); chemical lectures (3); laboratory practice (3); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Heat (2); chemistry (2); geology (3); English literature (1); essays (1); *optional,* six hours, of which at least three must be given to one of the following sciences: *botany, chemistry* or *zoology.*

Second Term.—Acoustics and optics (3); geology (3); English literature (1); essays (1); *optional,* seven hours, of which at least four must be given to one of the following sciences: *botany, chemistry* (including *mineralogy*) or *zoology.*

Third Term.—Acoustics and optics (3); descriptive geometry (4); English literature (1); essays (1); *optional,* seven hours, of which at least four must be given to one of the following sciences: *botany, chemistry, geology* or *zoology.*

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); *optional,* eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany, chemistry, geology, mathematics, physics* or *zoology.*

Second Term.—American history (2); political economy (2); *optional,* eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

Third Term.—Constitution of the United States, twelve lectures. *Optional,* eleven hours, subject to the same conditions as in the first term of this year.

The names of the sciences in the above lists of optional studies are used in the widest sense, and as including several quite distinct courses of lectures and laboratory practice, any of which may be taken either alone or in combination with others.

The optional hours not required for science in the junior and senior years may be given to either scientific, literary, historical or philosophical subjects. In electing their particular lines of study in the sciences of the junior or senior year, students will be required to take at least the minimum amount of each science elected that is given throughout the whole year.

Students intending to take the physics of the senior year must take the calculus of the sophomore year; those intending to take geology of the senior year must take blow-pipe determination of minerals previous to that year.

Students who have had an entrance examination in German will take elementary French five times a week and advanced German three times a week during the first year and advanced French three times a week during the second year, both in this course and in the course in science and letters; and those who have their entrance examination in French will take elementary German and advanced French the first year and advanced German the second year.

Students who enter with algebra, geometry and trigonometry will take elementary French and German with physiology, zoology and botany the first year, and advanced French and German the second year.

2. COURSE IN SCIENCE AND LETTERS

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Geometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); physics (3); ancient history (1); rhetoric (1); analytical geometry (5) *or* modern languages (2); *optional* (3).

Second Term.—French *or* German (3); physics (3); chemistry (3); ancient history (1); rhetoric (1); calculus (5) *or* zoology (3); and modern languages (2).

Third Term.—French *or* German (3); botany (3); physics (3); chemistry (3); ancient history (1); rhetoric (1); modern languages (2).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (4); geology (3); essays (1); English literature (1); *optional* (4).

Second Term.—Moral philosophy (2); history Roman Empire (4); essays (1); English literature (1); *optional* (7).

Third Term.—Logic (3); mediæval history (4); essays (1); English literature (1); *optional* (6).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law and polity (5); general literature and oratory (3); *optional* (5).

The hours marked optional may be filled with any science, mathematics, modern languages or literature, for which the student is prepared by previous study.

3. COURSE IN CHEMISTRY AND PHYSICS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Solid geometry (5); French and German (8), rhetoric and composition (2).

Third Term.—Trigonometry (5); French and German (8); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); French *or* German (3); experimental mechanics (3); physiology (3); chemical practice (2).

Second Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); zoology (3); chemical practice (6).

Third Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); botany (3); chemical practice (4).

THIRD OR JUNIOR YEAR.

First Term.—Chemical philosophy (3); heat (2); geology (3), chemical practice (7).

Second Term.—Chemical philosophy (3); mineralogy *or* metallurgy (2); organic chemistry (1); acoustics and optics (3); geology (3); chemical practice (5).

Third Term.—Chemical philosophy (3); chemical technology (2); acoustics and optics (3); chemical practice (7).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); physical practice (4); chemical practice (10); organic chemistry (1).

Second Term.—Metallurgy *or* mineralogy (2); organic chemistry (2); chemical practice (8); physical practice (4).

Third Term.—Chemical technology (2); chemical processes (2); chemical practice (5); organic chemistry (1).

4. COURSE IN MATHEMATICS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Algebra (2); spherical trigonometry (3); French and German (8); rhetoric and composition (2); linear drafting (2).

Third Term.—Harmonoid geometry (3); French and German (8); botany (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); experimental mechanics (3); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Second Term.—Analytic geometry of three dimensions (2); modern methods in analytic geometry (3); calculus (3); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Third Term.—Calculus continued (5); descriptive geometry (4); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); descriptive geometry continued (4); heat (2); physiology (3); essays (1).

Second Term.—Differential equations (3); quaternions (2); acoustics and optics (3); chemistry (3); zoology (3); essays (1).

Third Term.—Differential equations continued and theory of functions (5); acoustics and optics (3); chemistry (3); logic (3); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Analytic and celestial mechanics (3); mathematical essays (1); shades, shadows and perspective (3); history (3); geology (3); history of philosophy (2); English literature (1).

Second Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); astronomy (5); history (4); English literature (1).

Third Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); twelve lectures on the Constitution of the United States; English literature (1); *optional* (6).

For most of those studies in this course which are not closely connected with mathematics, substitutes will be allowed.

5. COURSE IN NATURAL HISTORY.

FIRST OR FRESHMAN YEAR.

First Term.—Modern languages (8); rhetoric (2); free-hand drawing (5); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

Third Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Modern languages (3); rhetoric (1); lectures on human physiology (3); physiological laboratory work (5); experimental mechanics (3).

Second Term.—Modern languages (3); rhetoric (1); lectures on general zoology (3); laboratory work in zoology (6); electricity and magnetism (2).

Third Term.—Modern languages (3); rhetoric (1); general lectures on botany (3); field work in botany (2); lectures on special zoology (2); laboratory work in embryology (2); electricity and magnetism (2).

THIRD OR JUNIOR YEAR.

First Term.—Lectures and laboratory work on vascular cryptogams (3); laboratory and field work on compositæ or special groups (2); lectures on geology (3); blow-pipe determination of minerals (3); heat (2); essays (1); English literature (1).

Second Term.—Lectures on vegetable physiology (3); vegetable histology (2); lectures on advanced and economic geology (3); laboratory work in geognosy (3); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Lectures and laboratory work on algæ and musci (2); special field and laboratory work in botany (3); lectures on palæontology (3); laboratory work in palæontology (3); laboratory and field work in entomology (2); acoustics and optics (3).

FOURTH OR SENIOR YEAR.

First Term.—Lectures and laboratory work on fungi (3); lectures on principles of horticulture (2); lectures on anatomy and physiology of domestic animals (5); laboratory and field work in geology (5); history of philosophy (2).

Second Term.—Lectures on systematic and applied botany (3); laboratory work on graminæ or special groups (2); (the course in botany for this term alternates with that of the winter term of the junior year); laboratory work in geology or palæontology (3); advanced work in either botany, geology or zoology (8).

Third Term.—Advanced work in botany, geology or zoology or veterinary medicine and surgery (13).

Students intending to enter medical schools will be allowed to devote to human anatomy and physiology some of the time otherwise given to general zoology. In case they take a partial course of less than four years, these students are advised to arrange their studies in consultation with the several professors of Natural History.

ADDITIONAL REQUIREMENTS.

In addition to the studies named in the foregoing courses students are required, in order to take the degree to which it leads, to attend lectures on general agriculture, and the lectures on modern history by President White.

V. THE COURSES IN AGRICULTURE

THE FULL COURSE OF FOUR YEARS.

Leading to the degree of Bachelor of Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); drawing, free-hand (3); German (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Chemistry, general (3); geometry (5); German (5); rhetoric and composition (2).

Third Term.—Chemistry, general (3); German (5); rhetoric and composition (2); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); German (3); experimental mechanics (3).

Second Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); drawing, free-hand (3); German (3); electricity and magnetism (2).

Third Term.—Botany (lectures (3), field work (2) (5)); entomology (5); German (3); land surveying (3).

THIRD OR JUNIOR YEAR.

First Term.—Botany (vascular cryptogams (3), compositæ and field work (2) (5)); geology (3); heat (2); veterinary anatomy and physiology (5).

Second Term.—Acoustics and optics (3); botany (vegetable physiology, lectures (3), vegetable histology and laboratory work (2) (5); chemical practice, quantitative analysis (4); veterinary medicine and surgery (5).

Third Term.—Acoustics and optics (3); botany, special field or laboratory work (3); chemical practice, quantitative analysis (5); veterinary medicine and surgery (5).

FOURTH OR SENIOR YEAR.

First Term.—Agriculture, lectures (5); practice (3, Tuesday

and Thursday afternoons); botany (fungi (3), principles of horticulture (2)) (5); geology, practice, (3).

Second Term.—Agriculture, lectures (5); practice (2, Tuesday and Thursday afternoons); botany (systematic and applied, lectures (3), laboratory work on gramineæ or special groups (2) (5)); horticulture (2).

Third Term.—Agriculture, lectures (4); practice (3, Tuesday and Thursday afternoons); building materials and construction (2); constitutional law (1).

A COURSE OF THREE YEARS.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); chemistry, agricultural (5); chemical practice (3); drawing, free-hand (3).

Second Term.—Chemistry, agricultural (5); chemical practice (5); geometry (5).

Third Term.—Botany (5); entomology (5); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany (5); geology (3); mechanics (3); veterinary anatomy and physiology (5).

Second Term.—Botany (5); chemical practice (5); veterinary medicine and surgery (5).

Third Term.—Botany (3); chemical practice (4); land surveying (3); veterinary medicine and surgery (5).

THIRD OR JUNIOR YEAR.

Same as the fourth year of the four years course.

VI. COURSE IN ARCHITECTURE.

Leading to the degree of Bachelor of Architecture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric (2); free-hand drawing (3); linear drawing; six lectures on hygiene, beginning on the first Tuesday in October.

Second Term.—Algebra (2); trigonometry (3); French *or* German (5); rhetoric (2); free-hand drawing (3); projection and tinting.

Third Term.—Descriptive geometry (4); draughting (2); French *or* German (5); rhetoric (2); shading.

SECOND OR SOPHOMORE YEAR.

First Term.—Descriptive geometry (4); French (3) *or* German (5); experimental mechanics (3); analytical geometry (5).

Second Term.—Calculus (5); French (3) *or* German (5); chemisty (3); electricity and magnetism (2); draughting.

Third Term.—Building materials and construction (3); French (3) *or* German (5); botany (3); electricity and magnetism (2); draughting (2); free-hand drawing (3).

THIRD OR JUNIOR YEAR.

First Term.—Shades, shadows, and perspective (3); mechanics (3); heat (2); lectures on Egyptian, Greek, and Roman architecture (3); designing (4).

Second Term.—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (5); optics and acoustics (3); mechanics (2); designing (4).

Third Term.—Optics and acoustics (3); lectures on Gothic architecture (5); free-hand drawing (3); designing (5).

FOURTH OR SENIOR YEAR.

First Term.—Lectures on renaissance architecture (3); lectures on composition and the art of designing (2); geology (3); designing (7).

Second Term.—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (3); designing (4).

Third Term.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., (3); designing (9); preparation of thesis.

VII. THE COURSE IN CIVIL ENGINEERING.

Leading to the Degree of Bachelor of Civil Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric and composition (2); free-hand drawing (3); six lectures on hygiene, commencing on the first Tuesday in October.

Second Term.—Algebra (2); spherical trigonometry (3); French *or* German (5); rhetoric and composition (2); right line drawing (2); free-hand drawing (3).

Third Term.—Descriptive geometry (3); draughting (2); French *or* German (5); rhetoric and composition (2); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); descriptive geometry (4);

French *or* German (3); experimental mechanics (3); draughting of original problems (2).

Second Term.—Analytic geometry of three dimensions (2); calculus (3); French *or* German (3); electricity and magnetism (2); chemistry (3); pen topography (2); tinting and shading (2).

Third Term.—Calculus (5); land surveying (4); electricity and magnetism (2); chemistry (3); lettering and sketching (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); architecture (3); shades, shadows and perspective (3); heat (2); topographical mapping and sketching (2).

Second Term.—Higher geodesy (5); analytic mechanics (5); mineralogy (2); acoustics and optics (3); graining and draughting details of structures (2).

Third Term.—Analytic mechanics (5); railroad surveying (5); acoustics and optics (3); colored topography (3).

FOURTH OR SENIOR YEAR.

First Term.—Spherical astronomy (5); analytic mechanics (5); geology (3); stereotomy (3); draughting of original problems; technical essay.

Second Term.—Analytic mechanics (5); metallurgy (2); advanced structural geology (3); stone cutting, original problems and draughting (5); plane table (1).

Third Term.—Civil engineering (3); engineering economy (2); bridge construction (5); water wheels (2); hydrographic surveying, chart making and geodetic practice (3); preparation of thesis.

Students in this course will be required to present, at the beginning of the first term of their second, third and fourth years, a memoir upon subjects selected by them before the close of the spring term. The memoirs of the first two years will refer to descriptions and drawings of some important engineering work, manufacturing process or other suitable subject; but during the remainder of the course the students are required to embody in their memoirs or reports original investigations.

VIII. THE COURSE IN MECHANIC ARTS.

Leading to the degree of Bachelor of Mechanical Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); free-hand drawing and shop practice (5).

Second Term.—Solid geometry (5); French *or* German (5); free-hand drawing and shop practice (7).

Third Term.—Trigonometry (5); French *or* German (5); descriptive geometry (3); shop practice (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); German *or* French (3); machine construction (3); descriptive geometry (4); shop practice (2).

Second Term.—Analytical geometry of three dimensions (2); calculus (3); German *or* French (3); chemistry (3); electricity and magnetism (2); shop practice (3).

Third Term.—Calculus (5); German *or* French (3); electricity and magnetism (2); chemistry (3); shop practice (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5): shades, shadows and perspective (3); heat (2); chemistry (2); rhetoric and composition (2); shop practice (3).

Second Term.—Acoustics and optics (3); machine construction and drawing (4); mechanics (5); rhetoric and composition (2); shop practice (3).

Third Term.—Machine construction and drawing (4); mechanics (5); mill work (4); shop practice (2).

FOURTH OR SENIOR YEAR.

First Term.—Mechanism (5); machine drawing (4); mechanics (5); shop practice (3).

Second Term.—Designing machinery (4); physical laboratory practice (4); steam-engine (5); shop practice (3).

Third Term.—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (5).

OPTIONAL COURSES.

Optional Courses are those which the student may select for himself; and in no course is it necessary, for the attainment of a degree, that the studies should be followed exactly in the prescribed order: and in the General Courses equivalents will be accepted, in some cases, for the studies indicated, provided they are of the same general character.

Any student, however, who intends to graduate at all should by all means select the course that leads to the degree he expects to take, and follow it in the order above laid down; the disadvantages of doing otherwise are so great as to render success almost impossible.

Undergraduates are also permitted, upon proper application to

the Faculty, at the beginning of any term, to transfer themselves from one of the General Courses to an Optional Course, or, with the consent of the Faculty concerned, to any Special Course. All the courses have been arranged upon a basis of three lectures or class exercises a day, thus occupying fifteen hours a week; but students who find themselves able to accomplish more than this are allowed to take additional studies. And so, too, students who are obliged to labor as a means of self-support are sometimes, upon sufficient reasons shown to the Faculty, excused from attendance upon the full standard number of University exercises. This, however, does not obviate the necessity of completing the entire course before graduating.

POST-GRADUATE COURSES.

No regular post-graduate courses have been marked out by the various Departments of the University. It is found that in most cases, students who desire to spend a portion of time at the University after taking their Baccalaureate Degree, have each of them some one special study to pursue, or object to accomplish, which differs in so many respects from those of any other student, that it is hardly possible to classify them or to arrange beforehand, in any general way, a course that will meet their wants. Accordingly, the practice thus far has been for the student himself to indicate, on his entering the University, his wishes; and in case the studies he wishes to pursue are not already provided for in the schedule for the term, his application is referred to the appropriate Faculty or to some one professor who is in charge of the department in which his studies are chiefly comprehended, when a course is arranged for him and provision made for his prosecuting it.

JOURNALISM.

Although no special course in Journalism has been marked out, students wishing to prepare themselves for Journalism or the profession of Law, who nevertheless cannot take a full course of four years, may, with the same qualifications for admission as are now required for the Course in Science, and some elementary knowledge of Latin, arrange for themselves an optional course, that can be completed in two years, which will include (1) one year of French, (2) one year of German, or two years of either or both the above languages, (3) all the studies and exercises in rhetoric, composition, oratory and general literature, (4) most of the studies in moral and intellectual philosophy, including psychology, logic, moral philosophy and the history of philosophy, (5) all the studies in the departments of history and political science.

EXAMINATION PAPERS.

ENTRANCE EXAMINATIONS.

[*The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek and in Latin, an oral examination was added to the written one.*]

ARITHMETIC.

1. Write the Metric table of Long Measure. What is meant by each of the prefixes, from *milli*—to *myria*—inclusive? How many cubic centimeters in a liter? In a gramme of distilled water? In a kilogramme of water? A cubical block whose edge is 250 millimeters is made of wood $\frac{4}{5}$ as heavy as distilled water. Find its weight in kilogrammes; also in pounds and ounces Avoirdupois, the kilogramme being about $2\frac{1}{5}$ lbs.

2. Define a Prime Number; Numbers prime to each other; the Least Common Multiple of two or more numbers. Find the greatest common divisor and the least common multiple of 437, 551, and 703.

3. Define an Integer; a Complex Fraction; a Compound Fraction. What is the reciprocal of $\frac{1}{3}$? Of $\frac{8}{3}$? Of 5? What does the denominator of a fraction represent? The numerator? Why is the value of the fraction unchanged when both terms are multiplied by the same number? Arrange in the ascending order of magnitude the fractions $\frac{11}{30}$, $\frac{10}{31}$, and $\frac{1}{3}$.

Simplify $$\frac{1}{1+\dfrac{2}{3\frac{1}{3}}}.$$

4. Divide 2.56 by .0032. By 3.2. By 320. State and demonstrate the rule for pointing off in multiplication of decimals. Make the following circulating decimals similar and conterminous; and add them: $.\dot{2}$, $.\dot{1}\dot{8}$, $.\dot{2}5\dot{6}$.

5. On a note for \$1500, dated Jan. 1, 1876, and bearing interest at 7 per cent., were the following indorsements: April 1, 1876, \$250; Dec. 5, 1876, \$400. What was due Jan. 1, 1877?

GEOGRAPHY.

1. Describe the systems of mountain chains by which the surface of the earth is traversed.
2. Describe the table-lands of Asia.
3. Describe the Great Northern Plain of Europe.
4. What is the average depth of oceans?
5. Name the principal ocean currents.
6. Bound Holland; Turkey in Europe; Switzerland.
7. Bound Beloochistan; China Proper; Arabia.
8. Bound Idaho; Missouri; Maryland.
9. Bound Bolivia; Uraguay; The Argentine Republic.
10. Over what waters would one sail from Philadelphia to the Crimea.
11. Over what waters would one sail from Bombay to Lyons?
12. Over what waters would one sail from Yokohama to Paris?
13. What countries would one pass on the right in coasting from Honduras to Alaska?
14. What countries would one pass on the left in coasting from Calcutta to Behring's Straits?
15. Name the countries of Africa.
16. Name the rivers of Spain, of France, of Germany, of Italy.
17. Over what countries would a straight line from Pekin to Madrid pass?
18. What productions of Africa form articles of commerce with the United States?
19. How could one go by water from Montevideo to Pittsburgh?

ENGLISH GRAMMAR.

1. Explain the use of *either* and *or*, *neither* and *nor*, *each*, *both*, *whither* and *whether*, *whence* and *thence*.
2. Mention the gutturals, dentals, and labials of the English alphabet.
3. What is meant by "parts of speech"?
4. State the use or function of each of the parts of speech.
5. When is a noun said to be in the objective case?
6. Give four examples of irregular comparison in adjectives.
7. How are reflexive pronouns formed?
8. Why are some pronouns called relative?
9. Is an objective case ever used after intransitive verbs?
10. Define *inflection*, *intransitive*, *finite*, *mood*, *participle*, *orthography*, *diminutive*, *orthoëpy*, *exception*.
11. Name some adverbs of negation; of cause and effect.
12. In what ways may the grammatical subject be enlarged?
13. When is a noun or an adjective used predicatively?
14. Give a definition of the two "parts of speech" required to form a sentence.

15. Change into the singular number the entire subject and the verb in the sentence: Those men are building houses.

16. When is *e* mute omitted at the end of a word, and when is it retained, a syllable being added?

17. State some of the uses of *it*.

18. State the grammatical relation and etymology of each word in the following sentence: Short his career, but ably run.

19. What is the objective or factitive predicate?

20. Write out correctly the following sentences:

(*a*) One fine afternoon everybody was on deck amusing themselves as they can.

(*b*) Whom but he was true to me.

(*c*) Lord Macaulay has been bolder than his predecessors; he has shrank from no conclusion.

(*d*) Which rule, if it had been observed, a neighboring prince would have wanted a great deal of that incense which has been offered up to him.

(*e*) Their chairs did not touch; they were placed one on either of the four sides of the table, leaving the fourth vacant.

(*f*) Man could now travel further in an hour than he had previously in a day.

(*g*) Six month's interest are due.

(*h*) He is a worthy representative of the great principles on whom Republicanism has always and must stand.

(*i*) Nothing need to be said so firmly and nothing oftener than this.

(*k*) How will we know which is the greatest of the two?

21. Give an example of the formation of the past tense from the present, by a change (*a*) of vowel; (*b*) of termination; (*c*) by no change.

22. Write a sentence containing an adjective clause, drawing a line under the clause.

23. Write an interrogative sentence, and parse it.

24. Write a sentence in which the verb has a direct and an indirect object, stating which is the direct and which the indirect.

PLANE GEOMETRY.

1. If the opposite sides of a quadrilateral be equal each to each, the equal sides are parallel, and the figure is a parallelogram.

2. To draw a common tangent to two given circles; and demonstrate.

3. Two triangles are similar, if their homologous sides be proportional.

4. The 4 bisectors of the angles of any quadrilateral form in general a second quadrilateral whose opposite angles are supplementary.

5. The surface [or the perimeter] of a regular inscribed polygon

and that of a similar circumscribed polygon being given, to find the surfaces [or the perimeters] of the regular inscribed and circumscribed polygons having double the number of sides.

ELEMENTARY PHYSIOLOGY.

[*At least five of the following questions will be asked.*]

1. Make an outline diagram of the body, excluding head and limbs, and locate within it the following organs: Stomach, heart, liver, lungs, spleen, kidneys, intestine, diaphragm.
2. Name the chemical elements of the body, stating which are gases.
3. What first happens to milk in the stomach?
4. Enumerate the digestive fluids, stating which is acid.
5. State all the uses of the stomach.
6. What is the object of digestion?
7. Give a diagram of the right side of the heart.
8. Of the left side.
9. What is the heart composed of?
10. What are the differences between the air inspired, and the air expired.
11. Give some familiar examples of acids.
12. Give some familiar examples of alkalies.
13. Describe the movements of a frog's heart while beating. (The frog is supposed to have been etherized, or killed by cutting the spinal cord just behind the head.)
14. Which way does blood flow in the arteries of the arm? Which way in the veins of the arm? How do you know?
15. Explain the pulse.
16. What changes in the form of the body occur during inspiration? What during expiration?
17. State the average number of your respirations per minute when sitting still; while standing; while lying down. State the same for the pulse.
18. What is the pupil of the eye?
19. What change of the pupil occurs when one comes from a dark into a lighter room?
20. Do the ribs usually move in respiration while lying down?
21. How many teeth has a child four or five years old, and what are they called?
22. How many teeth has a youth of fifteen?
23. How many has a grown person? Name the different kinds of teeth.
24. Name the uses of the tongue.
25. Name the uses of the lips and cheeks.
26. What happens in the throat when you swallow?
27. What is the difference between walking and running?

28. What is the peculiar property of the muscular tissue (the red flesh or lean meat)?

29. Make an outline diagram of a frog's brain. (Kill the frog, or toad, with chloroform, and remove the top of the head between the eyes with a penknife.

30. Enumerate the principal parts of the central nervous system. (They are the spinal cord, medulla oblongata, cerebellum, optic lobes, thalami, hemispheres, and olfactory lobes.)

ALGEBRA THROUGH QUADRATICS.

1 (*a*). Remove the parentheses from

$$3a^2-2b\left\{a+\frac{a}{b}[a-\tfrac{1}{2}(b+c)]\right\},$$

simplify the result, and find its value when $a=-2$, $b=3$, $c=0$.

(*b*). Divide $6x+4x^4+1+3x^2$ by $-2x+3+2x^2$, finding the quotient to 3 terms, the remainder, and the "complete quotient."

2 (*a*). What is meant by "a negative quantity"? Is $(-m)$ a positive or a negative quantity, if $m=-3$?

(*b*). What is the value of 0×0? Of 0×3? Of $\frac{3}{0}$? Of $\frac{0}{3}$, and why? Of $\frac{0}{0}$, and why?

(*c*). Into a cistern whose capacity is 1000 gallons and which is now half full, n gallons of water flow per minute, and 10 gallons flow out. How soon will the cistern be empty? Interpret your result when $n=10$; also when $n=15$.

3 (*a*). Factor completely $2ax^4-2ay^4$; also, $1+8a^3b^3$.

(*b*). Prove that when m is a whole number, a^m-b^m is always divisible by $a-b$.

4. Simplify $\left(\frac{x^2-y^2}{x^2+y^2}-\frac{x^2+y^2}{x^2-y^2}\right)\div\left(\frac{x-y}{x+y}-\frac{x+y}{x-y}\right)$.

5 (*a*). Find x, y and z from the equations $3x+2y+z=0$, $5x+3y+z=-1$, $2x-y+z=0$.

(*b*). Solve the equation $\sqrt{(x+11)}-\sqrt{x}=1$, and verify your result.

(*c*). Find how far you must ride at the rate of a miles an hour, and walk back at the rate of b miles an hour, to be gone c hours.

6 (*a*). Reduce the following radicals to their simplest form, and add them: $\frac{3}{4}(\sqrt[3]{96})$, $\sqrt[3]{\frac{3}{2}}$, $144^{\frac{1}{6}}$.

(*b*). Simplify

$$\frac{3^{-\frac{1}{3}}\,a^{\frac{1}{6}}}{3^{\frac{2}{3}}\,a^{-\frac{5}{6}}}(2b)^0;\ \text{also,}\ (5^{\frac{2}{3}})^{\frac{3}{4}}.$$

(*c*). Multiply $\left(a^{\frac{n}{2}}+a^{-\frac{n}{2}}\right)$ by $\left(a^{\frac{n}{2}}-a^{-\frac{n}{2}}\right)$.

7 (*a*). What is the value of $\sqrt{-5}\times\sqrt{-5}$, and why?

(*b*). Multiply $3+\sqrt{-2}$ by $\sqrt{2}-2\sqrt{-1}$.

8 (*a*). Solve the quadratic equation $x^2-5x+2=0$.

(*b*). Solve the equation $2x^2+8px=q$. What is meant by "a

root of an equation"? What conditions must p and q satisfy in order that the two roots of the above equation may both be real and positive? Both imaginary? Equal to each other?

(*c*). Form the quadratic whose roots are $2+\sqrt{3}$ and $2-\sqrt{3}$.

9. Extract the square root of $x^4-x^3+\frac{x^2}{4}+4x-2+\frac{4}{x^2}$.

FRENCH.

1. The house which you bought this week is that which was built a year ago. Is it not?

2. You must go and see it, but I do not believe that you can tell me if it is the same house.

3. Are you not afraid that the soldier will hurt the child? He has the French knives which he stole this morning from your father.

4. My sister was afraid that he was not coming, and I do not believe that she is wrong.

5. He wanted you to set out from Paris, but I do not think that you have money enough.

6. Are you my father's scholar of whom I have heard him speak? I am.

7. It is not I to whom you wrote, it is one of my younger brothers. I have just sent for him.

8. Whose silk is that which I saw in the store of the old English merchant? I would like to buy some. Who will sell me some?

9. My father is the best friend I have and I will give him the only horse I have.

10. It was in vain for her mother to reproach her, she said yesterday she was going to marry the French cook.

11. Do you know those ladies with whom we were speaking French when we were riding on horseback?

12. Where are the goods which you have just sold and which you wished my servant to carry to my house?

13. The birds you saw killed this morning are partridges, and I have bought some and will have them roasted to-morrow.

14. Do you remember the songs we heard him sing this summer, at your uncle's house? Would you not wish him to come and see us?

15. Would you wish her every day to sing French songs, read French books, write French exercises, and talk with certain good people?

GERMAN.

I.

1. Translate:

Aus "Undine."

Von dem, was dem Ritter im Walde begegnet war.

"Es mögen nun etwa acht Tage her sein, da ritt ich in die freie Reichsstadt ein, welche dort jenseit des Forstes gelegen ist. Bald darauf gab es darin ein schönes Turnieren und Ringelrennen, und ich schonte meinen Gaul und meine Lanze nicht. Als ich nun einmal an den Schranken still halte, um von der lustigen Arbeit zu rasten, und den Helm an einen meiner Knappen zurück reiche, fällt mir ein wunderschönes Frauenbild in die Augen, das im allerherrlichsten Schmuck auf einem der Altane stand und zusah. Ich fragte meinen Nachbar, und erfuhr, die reizende Jungfrau heisse Bertalda, und sei die Pflegetochter eines der mächtigen Herzoge, die in dieser Gegend wohnen. Ich merkte dass sie auch mich ansah, und—wie es nun bei uns jungen Rittern zu kommen pflegt—hatte ich erst brav geritten, so ging es nun noch ganz anders los. Den Abend beim Tanze war ich Bertalda's Gefährte, und das blieb so alle die Tage des Festes hindurch."

2. Parse the following nouns, writing the genitive singular and nominative plural of each: *Tage* (1), *Forstes* (2), *Ringelrennen* (3), *Arbeit* (5), *Knappen* (6,) *Pflegetochter* (10).

3. Parse fully the following verbs, giving the principal parts, rule for the mood, tense, and position of each: *mögen* (1), *ritt* (1), *gelegen ist* (2), *gab* (3), *halte* (5), *fällt* (7), *zusah* (8), *heisze* (10).

II.

1. Translate:

Man höret oft im fernen Wald
Von obenher ein dumpfes Läuten,
Doch Niemand weiss von wann es hallt,
Und kaum die Sage kann es deuten.
Von der verlor'nen Kirche soll
Der Klang ertönen mit den Winden;
Einst war der Pfad von Wallern voll,
Nun weiss ihn keiner mehr zu finden.

Jüngst ging ich in dem Walde weit,
Wo kein betret'ner Steig sich dehnet,
Aus der Verderbniss dieser Zeit
Hatt' ich zu Gott mich hingesehnet.
Wo in der Wildniss Alles schwieg,
Vernahm ich das Geläute wieder;
Je höher mein Sehnsucht stieg,
Je näher, voller klang es nieder.

Mein Geist war so in sich gekehrt,
Mein Sinn vom Klange hingenommen,
Dasz mir es immer unerklärt,
Wie ich so hoch hinauf gekommen.
Mir schien es mehr denn hundert Jahr',
Dasz ich so hingeträumet hätte:
Als über Nebelen, sonnenklar,
Sich öffnet eine freie Stätte.

2. Comment upon the following words, explaining any peculiarity in form, use, or meaning; point out derivative words and explain their origin: *obenher* (2), *Niemand* (3), *soll* (5), *Wallern* (7), *keiner* (8), *finden* (8), *jüngst* (9), *Steig* (10), *Verderbniss* (11), *gekommen* (20), *hingeträumet hätte* (22).

3. Define the clauses and their use introduced by *Wo* (10), *Dasz* (19), *Wie* (20), *Dasz* (22).

III.

Translate into German:

1. The prudent (*klug*) lady would have given advice to the old teacher, if he had allowed himself to be advised (*sich Rathe geben lassen*).

2. The young lady caused (*lassen*) the old serving-woman to be sent for (*holen*), who had fetched the letter.

3. Since (*da*) you have not sent us the letter, you will be obliged to cause the servant to fetch it.

4. If the traveler arrives (*ankommen*) to-day, then call me immediately.

5. Your friend understands the German language very well, but he speaks only a very little as yet, and he still takes lessons (*Unterricht*).

LATIN.

I.

1. Translate (Cic. in Cat., IV, 8):

Servus est nemo, qui modo tolerabili condicione sit servitutis, qui non audaciam civium perhorrescat, qui non haec stare cupiat, qui non quantum audet et quantum potest conferat ad communem salutem voluntatis. Quare si quem vestrum forte commovet hoc, quod auditum est, lenonem quendam Lentuli concursare circum tabernas, pretio sperare posse sollicitari animos egentium atque imperitorum, est id quidem coeptum atque temptatum. sed nulli sunt inventi tam aut fortuna miseri aut voluntate perditi, qui non illum ipsum sellae atque operis et quaestus cotidiani locum, qui non cubile atque lectulum suum, qui denique non cursum hunc otiosum vitae suae salvum esse velint.

2. Give the syntax of *condicione, voluntatis, concursare, for-*

tuna. Explain the subjunctives *sit*, *cupiat*, *velint*. Decline *nemo*, *vestrum*, *operis*, *quaestus*. To what classes of verbs do *perhorrescat*, *audet*, and *concursare* belong? Give the principal parts of *cupiat*, *audet*, *coeptum est*. Give the synopsis of *velint* in the second person singular. Give all the participles, infinitives, and imperative forms of *conferat*. Compare *bene*, *felix*, *facilis*, *primus*, *vetus*. State the time, place, and manner of Cicero's death.

II.

1. Translate (Virg. A. IV, 238–241):

Dixerat. Ille patris magni parere parabat
Imperio; et primum pedibus talaria nectit
Aurea, quae sublimem alis sive aequora supra
Seu terram rapido pariter cum flamine portant.

2. Who are meant by *Ille* and *patris?* Divide the passage into feet, and give rules for the quantities of vowels in the first line.

III.

Translate into Latin:

(1) He says that he has not many books. (2) Do you know how high this tree is? (3) I hope that our friend, after seeing the king, will come to Rome. (4) He fears that he cannot go to-day. (5) Tell me whether you are to come alone, or with your daughters.

GREEK.

[*N.B.*—Write the Greek words *with their accents.*]

I.

Translate any *three* of the following five passages, and answer the questions under *all* of them.

1. *Ξενοφῶν δὲ, παρελαύνων ἐπὶ τοῦ ἵππου, παρεκελεύετο· Ἄνδρες, νῦν ἐπὶ τὴν Ἑλλάδα νομίζετε ἁμιλλᾶσθαι, νῦν πρὸς τοὺς παῖδας καὶ τὰς γυναῖκας, νῦν ὀλίγον πονήσαντες ἀμαχεὶ τὴν λοιπὴν πορευσόμεθα.*

Give the gen. and dat. in all numbers of *Ἄνδρες*: the voc. sing. and the gen. plur. of *παῖδας*.

2. *Ταύτην μὲν οὖν τὴν νύκτα ἔμειναν ἐν πολλῇ ἀπορίᾳ ὄντες. Ξενοφῶν δὲ ὄναρ εἶδεν· ἔδοξεν ἐν πέδαις δεδέσθαι, αὗται δὲ αὐτῷ αὐτόμαται περιρρυῆναι, ὥστε λυθῆναι καὶ διαβαίνειν ὁπόσον ἐβούλετο.*

Give the nom. sing. and plur. in all genders of *ταύτην*: dat. plur. in all genders of *ὄντες*: synopsis of the tense and voice to which *ἔμειναν* belongs. In what tense, mood, voice, and from what verbs, are *εἶδεν*, *δεδέσθαι*, *περιρρυῆναι*?

3. *Ταῦτα ἐννοούμενοι καὶ ἀθύμως ἔχοντες, ὀλίγοι μὲν*

αὐτῶν εἰς τὴν ἑσπέραν σίτου ἐγεύσαντο, ὀλίγοι δὲ πῦρ ἀνέκαυσαν, ἐπὶ δὲ τὰ ὅπλα πολλοὶ οὐκ ἦλθον ταύτην τὴν νύκτα.

Give the principal parts of *ἔχοντες, ἀνέκαυσαν, ἦλθον.* Explain the phrase *ἀθύμως ἔχοντες*: the *case* of *σίτου.*

4. *Παύσασθε ἁμάρτοντες ἐς τὴν πατρίδα, καὶ μὴ πείθεσθε τοῖς ἀνοσιωτάτοις τριάκοντα, οἳ ἰδίων κερδέων ἕνεκα ὀλίγου δεῖν πλείους ἀπεκτόνασιν Ἀθηναίων ἐν ὀκτὼ μησὶν ἢ πάντες Πελοποννήσιοι δέκα ἔτη πολεμοῦντες.*

Give the acc. sing. in all genders of *πλείους*: the first seven cardinal numerals in Greek. Who were *the Thirty*, and how did they come into power?

5. *Καὶ γὰρ ἐν ταῖς μάχαις πολλάκις δῆλον γίγνεται ὅτι τό γε αποθανεῖν ἄν τις ἐκφύγοι καὶ ὅπλα ἀφεὶς καὶ ἐφ' ἱκετείαν τραπόμενος τῶν διωκόντων· καὶ ἄλλαι μηχαναὶ πολλαί εἰσιν ἐν ἑκάστοις τοῖς κινδύνοις ὥστε διαφεύγειν θάνατον, ἐάν τις τολμᾷ πᾶν ποιεῖν καὶ λέγειν.*

Give synopsis of the tense and voice to which *ἀφείς* belongs. Point out the enclitics in this passage. Explain the mood of *τολμᾷ.*

II.

Translate into Attic Greek: The men came to him, saying that they did not wish to march that night. Accordingly he remained, that they might not be despondent.

III.

Translate:

Ἔγρετο δ' ἐξ ὕπνου· θείη δέ μιν ἀμφέχυτ' ὀμφή·
Ἕζετο δ' ὀρθωθείς· μαλακὸν δ' ἔνδυνε χιτῶνα,
Καλὸν, νηγάτεον· περὶ δὲ μέγα βάλλετο φᾶρος·
Ποσσὶ δ' ὑπὸ λιπαροῖσιν ἐδήσατο καλὰ πέδιλα·
Ἀμφὶ δ' ἄρ' ὤμοισιν βάλετο ξίφος ἀργυρόηλον.

Give the Attic form of *θείη* and *ποσσί.* In what tense, mood, voice, and from what verbs, are *ἔγρετο* and *ἀμφέχυτο*? Scan the last line.

Τὴν δὲ χολωσαμένη προσεφώνεε δῖ' Ἀφροδίτη·
Μή μ' ἔρεθε, σχετλίη, μὴ χωσαμένη σε μεθείω,
Τὼς δέ σ' ἀπεχθήρω, ὡς νῦν ἔκπαγλ' ἐφίλησα,
Μέσσῳ δ' ἀμφοτέρων μητίσομαι ἔχθεα λυγρά,
Τρώων καὶ Δαναῶν, σὺ δέ κεν κακὸν οἶτον ὄληαι.

Give the Attic form of *προσεφώνεε, μέσσῳ, ὄληαι.* In what tense, mood, voice, and from what verbs, are *ἀπεχθήρω* and *ὄληαι*?

SOLID GEOMETRY.

1. The sum of any two face-angles of a triedral angle is greater than the third.

2. Two prisms are equal, if three faces including a triedral angle of the one are respectively equal to three faces similarly placed and including a triedral angle of the other.

3. The angle of two arcs of great circles is equal to the angle of their planes, and is measured by the arc of a great circle described from the vertex as a pole and included between its sides (produced if necessary).

4. The diameter of a sphere is 20 inches. Find its convex surface, its volume, and the area of a zone whose altitude is 20 inches.

The magnitudes of the angles of a triangle upon the above sphere, are $85°$, $100°$, and $130°$. Find the area of the spherical triangle in square inches.

PLANE TRIGONOMETRY.

1 (*a*). Express the six trigonometric functions as ratios, and show what function is the reciprocal of each.

(*b*). Prove that $1+\tan^2 A=\sec^2 A$; also, that $\cos A \div \sin A = \cot A$.

(*c*). Obtain the value of $\sin A$ in terms of $\tan A$.

2. Find the six logarithmic functions of $243° \; 25' \; 5''$. What functions of this angle are negative?

3. Obtain the formula for the cosine of the sum of two angles; and deduce the formula $\cos 2x = \cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x$.

4. Prove that in any plane triangle the sum of either two sides is to their difference as the tangent of half the sum of the opposite angles is to the tangent of half their difference.

5. Given two sides of a triangle equal to 99.3425 and 31.2345, and the included angle equal to $169° \; 58' \; 12''$, find the remaining angles.

TERM EXAMINATIONS—GENERAL COURSES.

I. HISTORY AND POLITICAL SCIENCE.

1. ANCIENT HISTORY—PROFESSOR RUSSEL.

1. Into what races are mankind divided ethnologically?
2. Into what families are the languages of Europe and Asia divided philologically?
3. To what race of mankind do the Chinese belong and to what family does their language belong?
4. About how far back do Chinese records extend?
5. What attention have the Chinese paid to the history of their nation?
6. When did Confucius live? What was the character of his teaching?
7. What nations successively conquered China, and at about what time? Of what nationality is the present ruling race?
8. To what race do the people of Hindoostan belong, and to what family does their language?
9. What attention did the East Indians pay to history? Describe their intellectual character and habits.
10. What have been the prevailing religions of the East Indians? State their doctrines.
11. By what nations has Hindoostan been successively conquered?
12. Of what race were the Babylonians?
13. How far back can we trace Babylonian history?
14. Of what nationality were the Assyrians?
15. What memorials of Babylonian and Assyrian history remain?
16. Describe Assyrian civilization.
17. By what nation were Babylon and Assyria conquered?
18. What was the extent of the Persian monarchy under Darius Hystaspis?
19. How far back does our knowledge of Egypt extend? To what races did the Egyptians belong?
20. What means have we of knowing Egyptian history and civilization? Describe their civilization.
21. By whom were Persia and Egypt finally conquered, and of whose empire did they become a part?
22. To what races did the Hellenes belong? Which were the two principal sub-races?
23. What was the general character of the Spartan government? What was the character of the Athenian government? Explain as to each.

2. ROMAN HISTORY—PROFESSOR RUSSEL.

I.

1. Who were the original Italians?

2. What other people belonged to the same family?

3. After the Italians came into Italy, into what nations were they divided?

II.

1. At what date does the authentic history of Rome begin?

2. What authority have we for facts said to have occurred before that period?

III.

1. What was a Roman gens? a curia? a century? a tribe?

2. Under what two great divisions were the free inhabitants of Rome classed?

3. What rights had they respectively?

4. What means of obtaining privileges did the unprivileged class several times use?

IV.

1. What principle in regard to the possession of land is conspicuous in Roman history?

2. How did the small proprietors of land lose it?

3. What was the effect on the prosperity of Rome, of the want of small landed proprietors?

4. What was the object of the agrarian law?

5. Who were the Gracchi, and what did they accomplish?

V.

1. What was the prevailing policy of Rome with respect to foreign nations?

2. By what wars did Rome extend her power?

VI.

1. What was the effect of foreign conquest on the prosperity of the Romans?

2. How did it affect their mode of life, their independence, their morality?

VII.

1. In the time of Marius who were Roman citizens?

VIII.

1. What were the original causes of the loss of Roman liberty?

2. Who first destroyed Roman liberty?

3. After him what form of government did Rome need?

4. Between what persons was the struggle for supreme power?

3. HISTORY OF THE ROMAN EMPIRE—PROFESSOR RUSSEL.

1. What were the powers of the Emperor Augustus and of his immediate successors? Whence were those powers derived?

2. After the time of the Antonines, what body virtually appointed the Emperor? What was the origin of that body, and how large was it?

3. What change did Constantine the Great make in the imperial residence and in the constitution of the empire?

4. By whom and when was the empire divided into two parts—the Eastern and the Western? Give the limits of the two parts. What was the effect of that division on the decline of the empire?

5. How and when did the Roman Empire of the West become extinct?

6. To what principal causes was the decline of the Roman empire due?

7. How were the Goths divided? Where did they come from? Where were they when they first appeared in Roman history? What Roman emperor was defeated by them and when? When and under whom did they finally conquer Italy? How long did they keep possession of it?

8. Who were the Franks and where did they live?

9. Who were the Alemanni? Where did they live?

10. Who were the Huns? Describe the effect of their emigrations on the empire?

11. Where did the Vandals come from? Who was their most distinguished leader? Where did they finally settle?

12. Where did the Lombards come from? When and under whom did they conquer Italy? State particularly how Italy was divided between them and the Exarchs.

13. Who was Pepin le Bref? In what way and when did he become king of France? What return did he make for the decision in his favor? What present power rests on this transaction?

14. Who was Mohammed? Give date of the Hegira. Give his character, his doctrines and his purpose.

15. What was the origin of the Ottoman empire? What was its extent in Asia? On what occasion did the Ottomans enter Europe?

4. MEDIÆVAL HISTORY—PROFESSOR RUSSEL.

I.

1. Describe the Celtic character and religion.
2. What was the result of the Roman conquest of Gaul?

II.

1. Whence did the invaders come who conquered the Gallo-Romans? Name the different nations and say where they settled.

III.

1. How many dynasties of French kings have there been?
2. Name them and the period of the duration of each.

IV.

1. How did the first dynasty come to an end?
2. Where was Neustria? Where was Austrasia?

V.

1. Who was the first Carlovingian king?
2. How and when did he become king? Describe the transaction, showing the advantages on both sides.

3. Describe the character of Charlemagne. What became of his kingdom and when?

VI.

1. Describe the territory and the authority of the earlier kings of the third dynasty.
2. By whom were they opposed? Describe the power of these opponents.
3. Which king of France first extended his authority over the whole country?

VII.

1. To what did the bishop of Rome owe his supremacy over the other bishops?
2. What was the foundation of the temporal power of the Popes?
3. What claim did the Popes make in relation to the government of foreign nations? State the foundation of this claim and on what ground it was resisted.
4. Describe the decisive struggle between the Popes and the temporal sovereigns and the result.

VIII.

1. Describe the feudal system.
2. Mention the various services which were due from the vassal to his lord.
3. Describe the mode of life of a feudal baron.
4. What were the good effects of the system?
5. How did the system operate on the lower classes?
6. How did feudalism come to an end?

IX.

1. What attempts were made under the Valois kings to secure popular liberty?
2. Why did they fail?
3. What was the tendency of the monarchy under those kings? Describe the progress of royal power.

5. MODERN HISTORY—PRESIDENT WHITE.

1. Give some account of Brunelleschi and his connection with the history of Florentine Art.
2. Sketch the cause of the decline of Art after Michael Angelo and Raphael.
3. Give a brief account of the Colloquies of Erasmus. Name some of them. State the resemblances between Erasmus and Voltaire.
4. Give the main features of the struggle between the Obscurantists and Humanists, with an account of the part taken by Pfefferkorn.
5. Give the dates of Charles V's accession to the thrones of Spain and Germany. What was his title as king of Spain?
6. Give a short account of the attempt, made by Charles V on

one side and Francis I on the other, to secure the alliance of Henry VIII.

7. What was the league of Schmalkalden? What was the Peace of Passau, and when?

8. State the effect of the war between Charles V and Joseph I on Protestantism in Germany.

9. Give the names of Loyola's principal associates in founding the Order of the Jesuits.

10. State the part taken by Sainez at the Council of Trent.

11. Give the date of the beginning of the Council of Trent. Where is Trent?

12. Describe the connection of Wallenstein with the Thirty Years War.

13. What is Cardinal Richelieu's relation to the history of religious toleration?

14. What struggle was going on in England at the time of the Fronde?

15. Name the two religious orders founded by St. Vincent de Paul.

16. Name the chief political opponents in Europe of Louis XIV. What were "Les Chambres de la Réunion"?

17. Give the main points in the connection of John Law with the French Government.

6. FRENCH HISTORY—PRESIDENT WHITE.

1. What is Mignet's remark regarding the transition from the classic literature of the time of Louis XIV to the philosophic literature of the time of Louis XV?

2. Give a general statement regarding Voltaire's life and influence.

3. Give some idea of the method of attacking old institutions in France taken by Montesquieu in the Persian Letters.

4. Give Rousseau's idea of representation in a republic as stated in the treatise on the Social Contract.

5. Name some of the principal Encyclopædists. Why were they so called? What relation do they bear in the history of French thought to Voltaire and Rousseau?

6. What was Jansenism?

7. Who was Maurepas? What were his ideas regarding the formation of the Ministry?

8. State the main agencies through which the American Revolution influenced the French.

9. Up to what period of the French Revolution was this influence exercised and why did it cease?

10. What was the great preliminary question regarding the States General to be decided before the meeting?

11. What as soon as it had met?

12. State Burke's objection to the way the States General was composed and give your own opinion.

7. ENGLISH HISTORY—PROFESSOR GOLDWIN SMITH.

1. Of what races is the British nation composed? In what districts does each race prevail?

2. What were the powers of the Saxon kings? Was the monarchy hereditary or elective?

3. What political struggle took place in the reign of Edward the Confessor?

4. Give the leading features of the policy of William the Conqueror in Church and State.

5. For what principle did Anselm contend against Henry I? What was the issue of the contest?

6. Of what tendency of the feudal system is the reign of Stephen an example?

7. What was the question at issue between Henry II and Thomas à Becket? What was the immediate, and what the ultimate result of the struggle?

8. State the good and bad features of the character of Richard I, connecting them with the state of morality and civilization in his time.

9. What was the most important article of the Great Charter?

10. What new religious orders appeared in England in the time of Henry III? What led to their foundation?

11. Give an account of the statute of Mortmain.

12. What economical crisis marked the reign of Edward III? To what legislation did it lead?

13. What led to the insurrection of Wat Tyler?

14. What were the political consequences of the Wars of the Roses?

15. Why is the reign of Henry VII said to mark the commencement of Modern History?

16. How far was the Reformation carried in the reign of Henry VIII?

17. What was the policy of the Protector Somerset?

18. Account for the religious reaction at the accession of Mary.

19. What led to the development of the English drama in the age of Elizabeth?

7. POLITICAL ECONOMY—PROFESSOR WILSON.

[*Specimens of sets of questions, twenty in all, drawn by lot by each student.*]

NO. 4.

4. What is utility or intrinsic value? What objects have such value? Has the same article different intrinsic values? How is this?

24. Who are *traders?* What is their relation to each of the two factors of wealth, quantity and value?

44. What has been the law or ratio of increase as between population and distributive wealth *up to this time?* Is there any reason to suppose that that ratio will ever be different?

64. What is simple barter? Show the advantages of a circulating medium as a labor-saving machine.

84. Explain the use of money as a *machine* for exchange. Why are gold and silver preferable to other metals?

NO. 12.

12. What is *price* and how does it differ from value? Show the error of Mill's doctrine [B. I. Chap. I. § 3.] that price results only from limitation of supply. Explain $P=V+(d-s)$.

32. In what sense is land a "force of nature," to what extent a "machine"? Regarded as a machine, what are the "forces" that it utilizes?

52. Show that the rate of wages will increase with the intelligence of the laborers. Does this apply to the educated few only or to the masses as well?

72. State and explain the principal ways in which the cost of transportation and exchange can be diminished.

92. State the difference, in case of loss by the sinking of a ship and such like calamities, between the loss of a sum in coin and that of the same sum in bills (1) to the parties themselves and (2) to the community.

8. PHILOSOPHY OF HISTORY—PROFESSOR WILSON.

[*Specimens of the sets of questions furnished to each student by lot.*]

NO. 2.

2. What are the three agents that control the causes and results of history? What are the different theories of their relative influence?

22. Why may we not expect any high civilization in extreme latitudes? What is the effect of elevation above sea level on civilization?

42. What influence has intellectual culture on religion with reference to (1) fetichism, (2) polytheism and (3) monotheism?

62. Describe the circumstances of race and physical position that made Athens the place of origin of modern civilization.

NO. 8.

8. Compare the value of the geological and the philological indications as to man's early conditions.

28. What size, in a city, is regarded as most favorable to civilization? What are the *physical* effects of increase beyond this limit?

48. How were the Chinese written characters formed? How do they differ from the polysyllabic words of Indo-European languages?

68. What circumstances, historically, gave the Christian religion an advantage over the heathen religions of the time?

9. AMERICAN LAW AND POLITY—PROFESSOR WILSON.

[*Forty lectures in all.—Sub-divisions of the Course.*]

I. The Constitution of the United States. Lects. I—XII.
II. International Law. Lects. XIII—XVII.
III. Municipal Law. Lects. XVIII—XX.
IV. Laws Relating to Property. Lects. XXI—XXXII.
V. Criminal Law. Lects. XXXIII—XXXVI.
VI. Legal Maxims. Lects. XXXVII—XL.

[*Specimens of subjects, forty in all, drawn by lot one for each student.*]

II.—The Continental Congress and Articles of Confederation.
IX.—Restraints upon Congressional Legislation. Art. I. Sec. 9.
XIV.—The relation of Nations in times of Peace.
XVII.—Rights and Liabilities in time of War.
XVIII.—Origin and Development of National Codes.
XXI.—Nature and Kinds of Property. Eminent Domain.
XXV.—Real Estates by Contracts among the living.
XXVII.—Contracts for Personal Property.
XXXI.—Agency and Partnership.
XXXIII.—What constitutes a Crime. Crimes against Governments.
XXXVIII.—Maxims relating to the Judiciary.
XL.—Maxims fundamental to all Law.

II. ANCIENT LANGUAGES.

I. LATIN—PROFESSOR PECK.

I. HORACE—ODES, I, 2, 30–52.

1. Translate:—

Tandem venias precamur
Nube candentes humeros amictus,
Augur Apollo;
Sive tu mavis, Erycina ridens,
Quam Jocus circum volat et Cupido;
Sive neglectum genus et nepotes
Respicis, auctor,
Heu nimis longo satiate ludo,
Quem juvat clamor galeaeque leves
Acer et Mauri peditis cruentum
Vultus in hostem;

Sive mutata juvenem figura
Ales in terris imitaris, almae
Filius Maiae, patiens vocari
        Caesaris ultor:
Serus in caelum redeas diuque
Laetus intersis populo Quirini;
Neve te nostris vitiis iniquum
        Ocior aura
Tollat: hic magnos potius triumphos,
Hic ames dici pater atque princeps,
Neu sinas Medos equitare inultos,
        Te duce, Caesar.

2. Who are meant by *Erycina ridens*, *auctor*, *filius Maiae*, and why are they introduced here? State the occasion and the thought of the Ode.

3. Construe *populo*, *vitiis*, *dici*. Compare *acer*, *juvenem*, *diu*, *ocior*. Give the derivation of *mutata*, *ales*, *almae*, *pater*. Form diminutives to *vultus*, *populo*, *filius*, and to the comparative of *magnos*.

4. Draw a map of Italy, and locate upon it *Anio*, *Antium*, *Roma*, *Tarentum*, *Tibur*, *Venusia*.

5. Translate, and make full metrical schemes of the lines
(1) Dignum laude virum Musa vetat mori.
(2) Ille mi par esse deo videtur.
(3) Doctrina sed vim promovet insitam.
(4) Neque hic lupis mos nec fuit leonibus.

II. DIALOGUS DE ORATORIBUS, IX.

1. Translate:—

Nam carmina et versus, quibus totam vitam Maternus insumere optat (inde enim omnis fluxit oratio), neque dignitatem ullam auctoribus suis conciliant neque utilitates alunt; voluptatem autem brevem, laudem inanem et infructuosam consequuntur. licet haec ipsa et quae deinceps dicturus sum aures tuae, Materne, respuant, cui bono est, si apud te Agamemnon aut Iason diserte loquitur? quis ideo domum defensus et tibi obligatus redit? quis Saleium nostrum, egregium poetam vel, si hoc honorificentius est, praeclarissimum vatem, deducit aut salutat aut prosequitur? nempe si amicus eius, si propinquus, si denique ipse in aliquod negotium inciderit, ad hunc Secundum recurret aut ad te, Materne, non quia poeta es, neque ut pro eo versus facias; hi enim Basso domi nascuntur, pulchri quidem et iucundi, quorum tamen hic exitus est, ut cum toto anno, per omnes dies, magna noctium parte unum librum excudit et elucubravit, rogare ultro et ambire cogatur, ut sint qui dignentur audire, et ne id quidem gratis; nam et domum mutuatur et auditorium exstruit et subsellia conducit et libellos dispergit. et ut beatissimus recitationem eius eventus prosequatur, omnis illa laus intra unum aut alterum diem, velut in herba vel flore

praecepta, ad nullam certam et solidam pervenit frugem, nec aut amicitiam inde refert aut clientelam aut mansurum in animo cuiusquam beneficium, sed clamorem vagum et voces inanes et gaudium volucre.

2. Origin, exact meaning, and syntax of *cui bono*. Customs alluded to in *deducit, salutat, prosequitur*. Etymology and precise force of *ultro*. Construction of *id, gratis*.

3. History, circumstances and influence of the *recitationes*.

4. Outline of the Dialogus. Prominent peculiarities of its style, and discussion of question as to its authorship.

5. Characteristics and explanation of the prevailing literary style of the age.

III. PLINY—EP. II, I.

1. Translate:—

Post aliquot annos insigne atque etiam memorabile populi Romani oculis spectaculum exhibuit publicum funus Vergini Rufi, maximi et clarissimi civis, perinde felicis. Triginta annis gloriae suae supervixit. Legit scripta de se carmina, legit historias et posteritati suae interfuit. Perfunctus est tertio consulatu, ut summum fastigium privati hominis impleret, cum principis noluisset. Caesares quibus suspectus atque etiam invisus virtutibus fuerat evasit, reliquit incolumem optimum atque amicissimum, tamquam ad hunc ipsum honorem publici funeris reservatus. Annum tertium et octogesimum excessit in altissima tranquillitate, pari veneratione. Usus est firma valetudine, nisi quod solebant ei manus tremere, citra dolorem tamen. Aditus tantum mortis durior longiorque, sed hic ipse laudabilis. Nam cum vocem praepararet acturus in consulatu principi gratias, liber quem forte acceperat grandiorem et seni et stanti ipso pondere elapsus est. Hunc dum sequitur colligitque, per leve et lubricum pavimentum fallente vestigio cecidit coxamque fregit, quae parum apte collocata reluctante aetate male coïit. Huius viri exequiae magnum ornamentum principi, magnum saeculo, magnum etiam foro et rostris attulerunt. Laudatus est a consule Cornelio Tacito: nam hic supremus felicitati eius cumulus accessit, laudator eloquentissimus.

2. Derivation of *dum*, and its successive meanings and constructions. Changed meaning of *privatus* under the empire. To whom do *Caesares* and *optimum* refer?

3. History of the word *Caesar* as a title. Prominent features of a *funus publicum*, and of a *laudatio funebris*. Misuse sometimes made of the latter.

4. Careers of Verginius Rufus and of Cornelius Tacitus, and their relations to Pliny.

5. Character of the Latinity and the literature of the Silver Age. Cicero's and Pliny's letters in regard to their style and historical value.

IV. LUCRETIUS—II, 1157–1174.

1. Translate :—

Praeterea nitidas fruges vinetaque laeta
sponte sua primum mortalibus ipsa creavit,
ipsa dedit dulcis fetus et pabula laeta;
quae nunc vix nostro grandescunt aucta labore,
conterimusque boves et viris agricolarum,
conficimus ferrum vix arvis suppeditati:
usque adeo parcunt fetus augentque labore.
iamque caput quassans grandis suspirat arator
crebrius, incassum manuum cecidisse labores,
et cum tempora temporibus praesentia confert
praeteritis, laudat fortunas saepe parentis
et crepat, anticum genus ut pietate repletum
perfacile angustis tolerarit finibus aevom,
cum minor esset agri multo modus ante viritim.
tristis item vetulae vitis sator atque vietae
temporis incusat momen caelumque fatigat
nec tenet omnia paulatim tabescere et ire
ad capulum spatio aetatis defessa vetusto.

2. Derivation and analogues in cognate languages of *fruges, fetus, pabula, caput, manus, genus, pietas, modus, caelum, capulus.* Unusual forms and constructions. Connection of this passage with the philosophy of Lucretius.

3. Biography of Lucretius; his personal character as gathered from his poem; his relations to his predecessors and to his successors; peculiarities of his versification; characteristics of his Latinity; an outline of his cosmical, theological, and ethical notions.

2. GREEK—PROFESSOR FLAGG.

I. PERSIANS OF AESCHYLUS.

I. *vv.* 1–139. Designate the principal divisions of this passage, and state by whom and in what manner each was probably performed. Give the technical name of the part comprising *vv.* 93–100. What difference in tone is observable between what immediately precedes and what follows this part?—Comment on *οἶτε* (16): *στεῦται* (49): *ἀκμονες* (51): *περσέπτολις* (65): *ἔσσεται* (syntax) 121.—Explain the metrical peculiarity of *v.* 32 (*cf.* 152). —*Translate vv.* 12–20 and 101–113.

II. *Translate vv.* 447–464. Explain the mood and tense of *ἐκσωζοίατο* (451) and *τράποιντο* (459). Scan *vv.* 447–448.—*Translate vv.* 739–752, and scan *v.* 741.

III. *vv.* 800–828. Explain the negative particles in *v.* 802. How does Darius say that he arrives at a knowledge of what he narrates in the following lines?—Explain the mood and tense of *ἐκχέη* (826).—Give the date of the historical event referred to in this passage. Show the significance of *Δωρίδος* (817.)

Mention any instances of tragedies with historical subject earlier than the *Persians*. By what means is the present play rendered Panhellenic (not exclusively Athenian) in spirit? How has Aeschylus contrived to give it the usual religious character? In what did the ὕβρις of Xerxes consist?

II. AGAMEMNON OF AESCHYLUS.

I. *Translate* (*a*) *vv.* 97–103: (*b*) 145–155: (*c*) 164–178: (*d*) 252–257.—Designate the main divisions of the Parodos, give a synopsis of the contents of each and show their bearing on one another. What state of mind on the part of the Chorus is exhibited by the Parodos as a whole?—Explain the mythological allusions in passage (*c*). Describe the ethical doctrine on which the dynasty of Zeus, as conceived by Aeschylus, is founded. What are the functions of the Aeschylean Μοῖρα?

II. *Translate* (*a*) 379 (ἔστω)–386: (*b*) 456–465 (ἀμαυρόν): (*c*) 700–708: (*d*) 750–762: (*e*) 987–994.—Point out the transitions of thought in the first Stasimon, and show how they accord with the feelings of the Chorus. How is the second Stasimon connected with the first, and each Stasimon with the Epeisodion preceding it? Wherein does the third Stasimon exhibit a different mode of reflection from the other two?—State fully the divergence from the popular belief announced in passage (*d*), with (*a*) and (*b*), etc. How far is the notion of a family curse reconcilable with Aeschylus' system of ethics? Give the Greek words which may be regarded as technical terms in the expression of the doctrine.

III. *Translate* (*a*) 925–934; (*b*) 1177–1190: (*c*) 1523–1536.—Give the leading traits in the character of Agamemnon as drawn by Aeschylus.—What artistic purposes are served by the scene between Cassandra and the Chorus? Remark on its relation to the unity of the tragedy.—Give the substance of Clytaemnestra's defense, and that of the Chorus' reply. Explain *vv.* 1535–6. What are the subjects of the second and third plays of the trilogy? State the grounds of the final reconciliation.

IV. From what verbs and where formed are ἐπίανεν (276): ὑπερέρας (786): πραθέντα (1041): ἔφευξας (1308): ἔλακες (1426): ἀλύξειν (1615)?

III. PLATO'S LACHES.

I. 181 A, B. What does ὅτι (before ὀρθοῖς) connect?—ὅτι before οἰκεῖα?—Where is ἀφίεσο formed?—Explain the case of ὅν (σὺ νῦν ἐπαινεῖ): the meaning of καὶ (σὺ δέ).—*Translate from* Εὖ γε *as far as* σοι εἶναι—Characterize Lysimachus from this passage and 180 D, E, etc.

II. *Translate* 192 E, 193 A.—Where is ἐκτήσεται formed?—Explain αὕτη (193).—Where is the proposition antithetic to (εἰδότα)

μὲν?—What is the fault in Laches' second definition of courage? What was the fault in his former one?

III. 196 C, D. Explain the construction of *οἴεται*: the force of *αὐτὴν* (*ταύτην τὴν ἐπιστήμην*). *Translate as far as οὕτως ἔλεγες.*—Wherein is the definition of Nicias proved to be faulty? To what important Socratic doctrine does the refutation of it lead?

How may the assumed time of this dialogue be approximately determined? Show the appropriateness of the selection of Nicias and Laches as interlocutors, with reference to their personal traits. How is Socrates represented in comparison with the two generals (see especially 188 C, etc.)?

IV. DEMOSTHENES (I. II. III. IV. VIII).

I. Ol. *I*, § 28.—*Translate the section.*—What faults in Athenian disposition and policy are summed up in this tripartite division of *ἅπαντας*?—Explain *εὐθύναι* as here used.—What may be said of the perorations of the Demosthenic speeches in general?

II. Ol. *III*, §§ 8–9.—Expand *τῆς περιστάσης ἂν ἡμᾶς αἰσχύνης* into a clause.—Explain the construction of *ποιήσειν* (§ 9).—What were the relations of the Athenians with the Thebans and the Phocians at this time?—*Translate* § 9.

Why may the events of the Olynthian war be said to form a period in the public career of Demosthenes?

III. *Chers.* §§ 5 and 6.—*Translate and analyze this period.*—Give a brief account (with date) of the negotiation of the Peace here spoken of.—Specify some points of which the treatment in this oration (§§ 13, 18, 35, 49, 51, 59, 61, 66, 76, 77,) is noticeably different from that adopted in the early speeches, and explain the difference of tone.

V. (A.) PINDAR.

Translate (*a*) Oylmp. I, 17 (*ἀλλά*)–29: (*b*) Nem. II, 13–18: (*c*) Isthm. I, 28–40.—Note, in (*a*), the transition to the mythical part and the words that have been previously introduced to prepare for the subject of it. What is there in the handling of this mythus that is characteristic of Pindar?—Show, in (*c*), the significance of coupling the two heroes named in the mythus, giving the obvious (17), and the (as is conjectured) remoter reason.

(B.) THEOCRITUS.

Translate (*a*) I, 39–44: (*b*) XI, 38–43: (*c*) XV, 132–138.—Explain (etymologically, by comparison with the Attic) the following dialectic forms:—*ᾠδήκαντι* (I, 43): *τράφω, νεβρώς* (XI, 40): *ἔχοισα* (XV, 131): *οἰσεῦμες* (133).—What are the merits that chiefly distinguish Theocritus among the writers of the Alexandrine period?

ARABIC—PROFESSOR RŒHRIG.

I.

1. Translate:—

هُوَ كَانَ رَجُلًا عَالِمًا
كُنْتُ حَاضِرًا

2. Explain the construction.
3. Change it to modern Arabic.

II.

1. Translate:—

غَزَالٌ مَرَّةً عَطِشَ فَجَاءَ إِلَى عَيْنِ مَاءٍ
يَشْرَبُ وَكَانَ ٱلْمَآءُ فِي جُبٍّ عَمِيقٍ ثُمَّ
إِنَّهُ لَمَّا رَامَ عَلَى ٱلطُّلُوعِ لَمْ يَقْدِرْ

2. Could فَأَتَى be substituted for فَجَاءَ ? Give other synonyms of جَاءَ What is the literal meaning of عَيْنُ مَآءٍ ?

III.

1. Translate the following lines from the Koran:—

إِيَّاكَ نَعْبُدُ وَإِيَّاكَ نَسْتَعِينُ
اِهْدِنَا ٱلصِّرَاطَ ٱلْمُسْتَقِيمَ صِرَاطَ ٱلَّذِينَ
أَنْعَمْتَ عَلَيْهِمْ غَيْرِ ٱلْمَغْضُوبِ عَلَيْهِمْ وَلَا ٱلضَّآلِّينَ

2. In what particular sense is ٱلصِّرَاطَ ٱلْمُسْتَقِيمَ to be understood in this connection?

IV.

The following is from Voltaire's Charles XII. The passage begins on page 208 in the Lippincott edition, with the words:— "*Charles XII menacé n'était pas maître de sa colère*, etc. Point out the correspondence between the Arabic translation and the French text.

فلما سمع كرلوس منه هذا التهديد لم
يتمالك نفسه من شدة الغيظ الذى قام به
وقال له أطع سيدك فيما أمرك إن أمكنك
ذلك واخرج من عندى فاغتاظ الباشا وخرج
من عنده مسرعا يركض فرسه على خلاف عادة الترك

SANSKRIT—PROFESSOR RŒHRIG.

I.

1. Translate the following text, which presents two dissimilar readings. Point out and explain the passages which differ from each other:—

अस्ति गौतमस्य मुनेस् तपोवने महातपा नाम मुनिः ।
अस्ति गौतमस्य महर्षेस्तपोवने महातपा नाम मुनिः ।

तेनाश्रमसन्निधाने मूषिकशावकः काकमुखाद् भ्रष्टो दृष्टः ।
तेनाश्रमसन्निधाने मूषिकशावकः श्येनमुखाद् भ्रष्टो दृष्टः ।

ततो दयायुक्तेन तेन मुनिना नीवारकणैः संवर्द्धितः ।
पश्चाद् दयालुना मुनिना नीवारकणैः स पालितः ।

तदनन्तरं मूषिकं खादितुम् अनुधावन् बिडालो मुनिना दृष्टः ।
तं च मूषिकं खादितुं यत्नाद् अन्विष्यं बिडालो मुनिना दृष्टः ।

तं मूषिकं भीतम् आलोक्य
तपःप्रभावात् तेन मुनिना
मूषिको बलिष्ठो बिडालः कृतः।
ततस्तेन तपःप्रभावात् मूषिको
बिडालः कृतः।

II.

1. Translate (Mahabharata, Calcutta, 1834, Vol. I, p. 482, from line 31):—

दमयन्ती तु रूपेण तेजसा यशसा श्रिया।
सौभाग्येषु च लोकेषु यशः प्राप सुमध्यमा।
अथ तां वयसि प्राप्ते दासीनां समलङ्कृतं।
शतं शतं सखीनाञ्च पर्युपासच्छचीमिव।

2. Do not the words यशसा ---------- यशः प्राप seem to imply some inconsistency or contradiction, a confounding as it were of *means* and *end?* the acquiring of something that was already possessed and even the obtaining of the latter by *itself* as a *means?*—And does not the *end* obtained (यशः) appear inferior or less than the *means* from which it resulted? (रूपेण + तेजसा + यशसा + श्रिया &c.)?
—And again, does not in those two verses, the unharmonious repetition

of the *same* word (यशः) as well as that of प्राप and in the last line प्राप्ते , tend to enfeeble the style and make it by its monotony unimpressive and unpleasant?

3. Does not this also, in a measure, apply to the ending षु in सौभाग्येषु which is immediately followed by लोकेषु ? And would not both sound and sense gain by the substitution of सौभाग्येन for सौभाग्येषु of the Calcutta Edition?

4. In what sense is लोकेषु to be understood?—Where does the substantive लोक come from? Exhibit its root in its principal ramifications as they appear in Greek, Latin, German, and English.

5. Of what is प्राप composed?—What is the literal meaning of सुमध्यमा ?

6. What does दास , fem. दासी originally denote? From what does it come? How do you explain it in दसपतिः? Compare with the latter the Greek δεσποτης.

7. What is the construction of वयसि प्राप्ते ? Illustrate it by other examples.

III.

1. Give analogous Sanskrit forms and words equivalent both in sound and sense, to the following Greek and Latin terms; explaining, moreover, every similarity in the principle of formation: viz. ἔδραμον, ἐδίδων, ἔδων, ἐτίθην, ἔθην, λέλοιπα, πέποιθα, ἕρπομεν, τέρπετε, πατέρα, δοτῆρα, *datus*, *junctus*, *sterno*, *creo*, *cupio*, *esto*, *sunto*.

2. Compare the Sanskrit स्वसृ with the German *Schwester* and the English *sister*. Show also its relation to the Latin *soror*.

3. What Sanskrit case-endings correspond in form to the Latin terminations of *nobis*, *vobis*, and to the Greek of ναῦφιν and ναυσί?

III. MODERN LANGUAGES.

I. FRENCH—PROFESSORS ROEHRIG AND STEBBINS.

Translate the following into French:

1. The bookseller has good books, and the carpenter has bad ones. Here are two. Which do you desire?
2. I am not satisfied with those which I have read; can you not lend me a better one?
3. There are ten trees in my garden, and fourteen in my brother's, how many have you in yours?
4. I have only two, and I gave them to him, and I cannot sell you any.
5. Wine is good for the sick; milk is better for you and me, and water is excellent when one is thirsty.
6. Has the girl any more silk? I need some in order to mend my silk stockings.
7. She bought some this week, but used some in order to mend my hat, and now she has no more.
8. Who asked for my mother to-day? The painter, whom you know, asked if she was at home: I do not know what his name is.
9. It is not suitable for us to go out when it rains, nor to remain at home when it is fine weather.
10. In order to learn French you must study and write many exercises.
11. At what hour did your brother go to bed this evening? We could not speak to him, for he went away too early.
12. Are you General Smith's oldest daughter? No, sir, I am not.
13. Has anything happened to them? We did not see them at church this morning.
14. Why do you not make haste? It is a quarter before nine, and you are to take your little brother to school.
15. I have eaten nothing the whole day, but I am neither hungry nor thirsty.
16. Colonel G. has money and he buys beautiful paper and French engravings. It does not become him to reproach me with my conduct.
17. Those apple trees are mine, these are my wife's. Whose are the flowers which you are carrying from market?
18. They belong to my shoemaker. He has just bought them this afternoon and now is going to put them in his child's garden.
19. If you have heard of your son, it is important that you write to him and tell him not to marry that girl; he ought not to go near her.
20. I doubt that he goes to England. I do not believe that he has any friends there, and I do not think that one can be without friends in a foreign country.
21. As soon as he had said this, he rose and spoke to them, and

said, "Do not injure him, bring him to me, and remember what he did to you when you had few friends and needed brave ones."

22. Whatever I may do, I cannot help laughing when that boy comes near me; the sleeves of his coat are six inches too short, and he wears a white cloth hat and he carries a cotton umbrella.

23. Take care not to lose your purse. I am afraid you have left it in your room, and you must pay your tailor to-morrow seventeen dollars for your half-dozen shirts.

II. SECOND YEAR—SECOND TERM.—PROFESSOR CRANE.

I. CORNEILLE'S CID.

1. *Translate:*

Les Maures vont descendre; et le flux et la nuit
Dans une heure à nos murs les amènent sans bruit.
La cour est en désordre, et le peuple en alarmes;
On n'entend que des cris, on ne voit que des larmes.
Dans ce malheur public mon bonheur a permis
Que j'ai trouvé chez moi cinq cents de mes amis,
Qui, sachant mon affront, poussés d'un même zèle,
Se venaient tous offrir à venger ma querelle.
Tu les as prévenus; mais leurs vaillantes mains
Se tremperont bien mieux au sang des Africains.
Va marcher à leur tête, où l' honneur te demande:
C'est toi que veut pour chef leur généreuse bande.
De ces vieux ennemis va soutenir l'abord,
Là, si tu veux mourir, trouve une belle mort;
Prends-en l' occasion, puisqu' elle t' est offerte;
Fais devoir à ton roi son salut à ta perte:
Mais reviens-en plutôt les palmes sur le front.

2. Give principal parts of all irregular verbs in the above passage.

3. Parse *Tu les as prévenus*, (line 9), and give rule for agreement of past participle in compound tenses.

4. Parse *c'est toi que*, (line 12). Parse *Fais devoir à ton roi son salut*, (line 16), and illustrate this construction by an original example. Give etymology of *bonheur*, (line 5).

5. Divide the first three lines into feet, and indicate the cæsura. What are the various names applied to this metre, and why?

6. State what you know about the sources of this play.

II. LA MAISON DE PENARVAN, PAR JULES SANDEAU.

a. 1. *Translate:*

PAUL (*se levant aussi*). Ah! ma cousine, si vous le prenez ainsi, nous ne pourrons jamais nous entendre. Il y a entre nous une révolution, un monde écroulé, un abîme . . . et nous ne parlons pas la même langue.

RENEE. C'est tant pis pour vous, monsieur de Penarvan!

PAUL. Et que m'importent les destinées de la maison de Penarvan? Est-ce que je la connais? Qu' a-t-elle fait pour moi? Votre père, anticipant sur la mort, avait jugé plaisant de rayer le mien du nombre des vivants; vous, ma cousine, vous ne saviez pas même que je fusse de ce monde, et il a fallu qu'un hasard se chargeât de vous l'apprendre . . . . Vous êtes accourue; pourquoi? pour rapprocher les débris de notre famille? pour m'apporter l'oubli du passé? Allons donc! Vous n'êtes venue que pour préserver cet illustre nom de la souillure d'une mésalliance . . . une mésalliance pour vous, mais non pour moi, qui me fais gloire d'être de mon temps et ne suis d'ailleurs ni duc ni marquis.

2. Parse *pis* (line 5), *que* (line 6), *est-ce que* and *qu'* (line 7), *qui me fais* (line 15).

3. Explain mood of *fusse* (line 10), and *chargeât* (line 11).

b. 1. Explain the accent in: *à, là, dû, tû, mâle, château, état, finît.*

2. Write the first person singular, present indicative of *se promener, posséder, appeler, jeter,* and the feminine of *premier* and *complet.*

3. Translate line 1021 of the Cid: *Justes cieux! me trompé-je encore à l'apparence. Ou si je vois enfin mon unique espérance?* Explain *trompé-je.*

c. Translate into French the following sentences:

1. When I shall have caused myself to be killed perhaps she will regret me.

2. I have seen them (masc.) strike.

3. I have seen them (fem.) struck.

4. I have heard her sing a French song.

III SECOND YEAR—THIRD TERM.—PROFESSOR CRANE.

I.

1. *To be translated at sight:*

MONTAIGNE.

On sait avec quelle constance il avait étudié les grands génies de l'ancienne Rome, combien il avait vécu dans leur commerce et dans leur intimité. Doit-on s'etonner que son ouvrage porte, pour ainsi dire, leur marque, et paraisse, du moins pour le style, écrit sous leur dictée? Souvent il change, modifie, corrige leurs idées. Son esprit, impatient du joug, avait besoin de penser par lui-même; mais il conserve les richesses de leur langage et les formes de leur diction. L'heureux instinct qui le guidait lui faisait sentir que, pour donner à ses écrits le caractère de durée qui manquait à sa langue, trop imparfaite pour être déjà fixée, il fallait y transporter,

y naturaliser en quelque sorte les beautés d'une autre langue, qui, par sa perfection, fût assurée d'être immortelle; ou plutôt, l'habitude d'étudier les chefs-d'œuvre de la langue latine le conduisait à les imiter. Il en prenait à son insu toutes les formes, et se faisait Romain sans le vouloir. Quelquefois, réglant sa marche irrégulière, il semble imiter Cicéron même. Sa phrase se développe lentement, et se remplit de mots chosis qui se fortifient et se soutiennent l'un l'autre dans un enchaînement harmonieux.— *Villemain*, 1790–1867.

2. Give principal parts of *sait*, *vécu*, *doit*, *paraisse*, *écrit*, *sentir*, *fallait*, *conduisait*, *remplit*.
3. Parse *paraisse*, *fût assurée*.
4. Parse *quelle*, *lui faisait sentir que*.
5. Derivation of *durée*, *insu*.

II.

1. *To be translated at sight:*

A QUOI DOIVENT TENDRE LES EFFORTS DU SAGE.

C'est l'erreur que je fuis: c'est la vertu que j'aime.
Je songe à me connaître, et me cherche en moi-même.
Sur cette vaste mer qu ici-bas nous courons,
Je songe à me pourvoir d'*esquif et d'avirons,
A régler mes désirs, à prévenir l'orage,
Et sauver, s'il se peut, ma raison du naufrage.
C'est au repos d'esprit que nous aspirons tous;
Mais ce repos heureux se doit chercher en nous.
Un fou rempli d'erreurs, que le trouble accompagne,
Est malade à la ville ainsi qu'à la campagne.
De nos propres malheurs auteurs infortunés,
Nous sommes loin de nous à toute heure entraînés.
A quoi bon ravir l'or au sein du nouveau monde?
Le bonheur tant cherché sur la terre et sur l'onde
Est ici, comme aux lieux où mûrit le coco,
Et se trouve à Paris de même qu'à Cuzco:
On ne le tire point des veines du Potose.
Qui vit content de rien possède toute chose:
Mais, sans cesse ignorants de nos propres besoins,
Nous demandons au ciel ce qu'il nous faut le moins.

—*Boileau*, 1636–1711.

2. What is the metre of this poem?
3. Explain the use of the article with *erreur*, *vertu* (line 1), *or* (line 13), *bonheur* (line 14).
4. Derivation of *prévenir* (line 5), *naufrage* (line 6), *mûrit* (line 15).

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* Skiff and oars.

2. GERMAN.

I. FIRST YEAR—THIRD TERM.—PROFESSORS HEWITT AND MACKOON.

I.

1. How has *zu* in German, *to* in English, come to be used with the infinitive form of the verb?

2. What relations in a sentence may this form of the infinitive sustain?

3. When is the infinitive without *zu* used?

4. What is the office of the participle in the tenses called compound, and throughout the passive voice?

5. How does the subjunctive differ from the indicative in meaning and in form? Three of its main uses.

6. How have prepositions been chiefly derived?

7. How were expressed, in the earlier forms of German and English, the relations which are now indicated by prepositions?

8. How are conjunctions classified? Mention all the general connectives.

9. What means are employed in the derivation of verbs, nouns and adjectives? What is the primitive form of these parts of speech?

10. Expand the three letters *t*, *k*, *p*, into the nine Indo-European mutes; state the law of their progression, and show by a table how according to this law they would be represented in German and English. Show by a separate table the actual correspondence between English and German.

Translate into English, (Whitney's "Reader," p. 158) from "So findet die Erwartung sich jeden Tag genährt," to "Sondern in einem Saale unter Bekannten zu sein."

II.

1. What is the syntactical relation of *Tag* (1), *Strasse* (12), *Galerie* (13)?

2. Point out in the first two periods five different classes of pronouns.

3. Why is *auf* separated from *packen* (7), and why does it adhere to *hört* (12)?

4. Where is *sei erlaubt* (3) made? why subjunctive? Why is *sei* not transposed? Explain *werden behängt* (8, 9) and *behängt sind* (14).

5. Why do *tritt* and *glaubt* (19) stand at the end and beginning of their respective clauses?

6. What kind of subordinate clauses are introduced by *bis* (2), *die* (11), *dass* (17)? Show their relation to the words on which they depend.

7. Why does *selten* (17) not immediately precede its verb, *erinnert*, as well as *nun* (11) its verb, *aufhört*? Why is *sondern* (19) used, rather than *aber*?

8. Explain the use and meaning of the suffixes: ***ung*** in ***Erwartung*** (1); ***lich*** in ***endlich*** (2), ***icht*** in ***thöricht*** (3), ***haft*** in ***ernsthafte*** (4), ***er*** in ***Römer*** (4), ***gekläppert*** (7), ***wohnbarer*** (18), ***fält-ig*** in ***sorgfältig*** (5), ***ig-keit*** in ***Bedächtigkeit*** (6), ***bar*** in ***wohnbarer*** (18).

9. Give the derivation of ***legt*** (4), ***hütet*** (5), ***nach*** (9), ***erinnert*** (17), ***immer*** (18), ***nicht*** (19).

10. What are the English cognates of ***Glocke*** (2), ***Zeichen*** (3), ***erlaubt*** (3), ***Augenblick*** (4), ***gleicht*** (12), ***Zimmer*** (16), ***Dach*** (17), ***tritt*** (19), ***glaubt*** (19), ***sondern*** (19).

III.

Translate into German:

When two French grenadiers, who had been prisoners in Russia heard that France had lost, and that the emperor was a prisoner, they wept together over this sad news. Then said [the] one *of them*, who was wounded: "My old wound burns again and pains me sorely; I shall not live much longer." "Thou canst die," replied the other, "for thou hast neither wife nor child at home, who would have to go begging, but for thee." "Wife or child concerns me not," said the first again, "when my emperor is taken. If thou comest to France, grant me this last request: have me buried in French earth, with my musket in my hand, and the cross of honor on my breast, that I may lie there and listen till the emperor shall ride over my grave; then I will come forth armed, to protect him."

IV.

[*The Honor Section may perform the following in addition to the foregoing*].

Translate into English, (Whitney's "Reader," p. 26) from "Der Ritter fuhr in seiner Erzählung fort," to "meines Rosses Lauf ungestüm kreuzend und hemmend."

1. Derivation of *Ritter* (1), ***Erzählung*** (1), ***Erhitzung*** (3), ***sein*** (8.)

2. Etymology of *Pferde* (2), *Angst* (3), *grund* in *Abgrunde* (5), *kreuzend* (11), *Fürst* (3).

3. English cognates of the root in ***Erzählung*** (1), ***scheuen*** (2), ***triefte*** (3), *Angst* (3), *werfe* (5).

4. Parse *wäre angerannt* (1, 2, 3), ***werfe*** (5), and give the reason for the subjunctives.

5. Define the terms "inversion" and "transposition," and give the rules for the employment of each.

II. SCHILLER'S WILHELM TELL.—PROFESSOR FISKE.

[*Examination for two Terms.*]

I.

1. ***Translate***, (Act I, sc. 2) from "Er ist dir neidisch, weil du glücklich wohnst," to "Der kluge Mann baut vor."

2. Give *a.* the plurals of *Mann*; *b.* the various meanings of *Erb*; *c.* the difference in the construction of the clauses introduced by *weil* (line 1) and *denn* (line 3); *d.* the reason for the form *keins* and the etymology of the word; *e.* the etymology of *Kaiser* and the importance of it in philology; *f.* the various meanings of the stem *Reich* (or *reich*) and the cognates in English; *g.* the cognates of *trägst*; *h.* the omission in line 5 and the rule for it; *i.* the plurals of *Land* and their various significations; *j.* the inflection of *Herrn*; *k.* the various changes of the stem in *höchsten*; *l.* the reason for *-heit* in *Christenheit*; *m.* the composition of *jüngrer*; *n.* the derivation and grammatical character, as here used, of *sein* (fourth word in line 9); *o.* the etymology of *Glück*, of *giftger*, of *Missgunst*; *p.* the abstract noun derived from the stem of *längst* and the rule for such derivation; *q.* the English cognates of *geschworen*; *r.* the English vocables cognate with *baut*; *s.* the principal parts of *darfst* (4), *zeigen* (4), *erkennst* (6), *sieht an* (10–11), *geschworen* (12), *erwarten* (13).

3. Who is meant by "*den höchsten in der Christenheit*," and why was he so styled?

II.

1. *Translate*, (Act II, sc. 1) from "Ja, ich verberg es nicht." to "Auf deinem eignen Erb und freien Boden."

2. Give *a.* the English cognate of *berg* in *verbergen* and other words in which *g* is similarly represented in English; *b.* the derivation of *Fremdlinge*; *c.* the cognate of *schelten*; *d.* the reason why the Eng. pers. pron. *I* consists of a long or diphthongal vowel while *i* in *ich* is short; *e.* the cognate of *edle*; *f.* the derivation of *Jugend* and the concrete noun in German corresponding to it; *g.* the origin of *-s* in *rings*; *h.* the etymology of *Ehre*; *i.* other words derived from the same stem as *sammeln*, *j.* the etymology of the noun *Habsburg* and the historical importance of the place; *k.* the difference in signification between Germ. *still* and Eng. *still*; *l.* the derivation of *geschehen*; *m.* the etymology of *Welt*; *n.* the use of *Ge-* in such words as *Getön* (12) and *Geläut* (16); *o.* the significations and plurals of *der Heerd* and *die Heerde*; *p.* the force of *ver* in *verführt* (17) and *verachte* (18); *q* the reason for the form *Geburts* in *Geburtsland*; *r.* the rule by which "*schäme dich!*" is translated "be ashamed!"; *s.* the rule for the omission of the inflectional ending in *uralt*; *t.* the cognates of *kaufe* in *verkaufe*; *u.* the 2d pl. imper. of *nimm* and its Eng. cognates; *v.* the cognate of *werd*, of *Knecht* in *Fürstenknecht*; *w.* the principal parts of *schelten* (3), *liegen* (6) and its causal, *verlieren* (8), *geschehen* (9), *ladet* (13—old and new), *dringt* (14) and its causal, and *verführt* (17).

3. Who are meant by the *Fremdlinge* (2)?

III.

1. *Translate*, (Act. III, sc. 3) from "Lasst es genug sein, Herr!" to "Dem's Herz nicht in die Hand tritt noch ins Auge."

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2. Give *a.* the composition of *unmenschlich* and the etymology of its stem; *b.* the grammatical term used in explaining the difference in form between *durch* and its Eng. cognate; *c.* the derivation of *Schuld; d.* the government of *kennen; e.* the use here of the form *lernen; f.* the government of *Stunde; g.* the prepositions and cases by which *denken* may be followed; *h.* the derivation of *öffnet; i.* the etymology and cognate of *Gasse; j.* the cognates of *Frisch; k.* the etymology of *gnädig; l.* the etymology of *Geschick* and any other noun of the same stem; *m.* the difference between *der* (13) and *den* (14); *n.* the derivation of *Spruch* and the reason why its radical vowel is *u*; *o.* the etymology of *sicher* and its cognates; *p.* the government of *Blicks* and its cognate; *q.* the principal parts of *gilt* and its cognate; *r.* the etymology of *Kunst; s.* the cognate of *auch*; *t.* the difference in form between *andrer* and its cognate; *u.* the grammatical character of *mir* in line 19.

IV.

Give *a.* the different reasons for the inversion of sentences; *b.* the etymology of the words *Freund* and *Feind; c.* the rule for the formation of the pret. subj. of strong verbs; *d.* the rule for the employment of the superlative adj. as predicate and adverb; *e.* some of the nouns derived from the verb *binden* with their genders and plurals.

V.

1. Give *a.* the dates and places of Schiller's birth and death; *b.* the time of his birth as compared with that of Goethe and of Lessing; *c.* the date of the composition of "Wilhelm Tell"; *d.* the names of Schiller's principal other dramas and the country in which the scene of each is laid.

2. Draw a rough map of the scene of "Wilhelm Tell," indicating the position of the lake, the cantons and places mentioned in the drama.

III. GERMAN LITERATURE.—PROFESSOR BOYESEN.

FIRST AND SECOND TERMS.

I.

1. Name the still existing monuments of the Gothic language.
2. State what is known concerning the Gothic translation of the Bible.
3. Name the most important works written in the Old High German language (*Althochdeutsch*).
4. Give the names of the principal actors in the Nibelungen Lied and a brief outline of the plot.
5. Give a brief æsthetic analysis of the Nibelungen Lied, and point out its characteristic excellencies and deficiencies as compared with the Epic of the Greeks.

6. Sketch rapidly the story of Gudrun.
7. Give the titles of the old German poems which deal with the Arthurian legends and the Holy Grail.

II.

1. Give the names of six of the most prominent Minnesingers who are known as authors of still existing Epics.
2. Describe the Minnesinger period in its historic and literary aspects as compared with the Meistersänger period.
3. State what you know about Walter von der Vogelweide, and give a list of the writings commonly attributed to him.
4. Give a brief account of the life of Ulrich von Liechtenstein.
5. Describe the metrical structure of the Minnesong as compared with the Minne-lay.
6. Define the literary tendencies of the fourteenth and fifteenth centuries.
7. State what you know about Hans Sachs.
8. Name the German satirists of the sixteenth century and give a list of their most important works.

IV. GERMAN LITERATURE.—THIRD TERM.

III.

[*Each student is required to answer any ten consecutive questions.*]

1. Describe briefly the literary character of the seventeenth century as represented by Opitz and his school.
2. State what you know about the institutions in Germany, corresponding to the Italian Academies of the fifteenth and sixteenth centuries. Trace their influence upon literature.
5. Mention the more prominent poets of the three Silesian schools.
4. What is the character of the writings of Lohenstein and Hofmannswaldau?
5. What were the principles involved in the controversy between Gottsched and Bodmer? Sketch rapidly the history and the result of the struggle.
6. Trace the development of the German novel (*Roman*) through the seventeenth and eighteenth centuries.
7. Give a concise account of the life and literary activity of Klopstock.
8. Give a complete list of Lessing's works, and the dates of his birth and death.
9. Sum up briefly the intellectual results of Lessing's life, define the principles for which he fought; his merits and his deficiencies as a dramatist.
10. What is understood by the Period of Enlightenment (*Aufklärung*)?
11. What are Wieland's characteristics as a man and an author?

12. State the leading traits of the Storm and Stress (*Sturm und Drang*) Period. What were its causes and what its results?
13. What were the ideas, foreshadowed or distinctly stated in Herder's writings, which have proved so fruitful to the science and literature of the present century?
14. Name those works of Goethe which are usually regarded as products of the Storm and Stress Period.
15. Give a rapid sketch of the life of Friedrich von Schlegel.
16. Give a criticism of Heinrich Heine as a lyric poet.

ICELANDIC.—PROFESSOR FISKE.

I.

Translate the following passage from the *Gunnlaugs Saga Ormstungu* (Section 11):

Nú búast menn til boðs um vetrinn. Þorkell frá Skáney bauð Illuga svarta ok sonum hans. Ok er Illugi bóndi bjóst, þá sat Gunnlaugr í stofu ok bjóst ekki. Illugi gekk til hans ok mælti:—"Hví býst þú ekki, frændi?" Gunnlaugr svarar:—"Ek ætla eigi at fara." Illugi mælti:—"Fara skaltu víst, frændi!" segir hann, "ok slá ekki slíku á þik, at þrá eptir einni konu, ok lát sem þú vitir eigi, ok mun þik aldri konur skorta." Gunnlaugr görði sem faðir hans mælti; ok kvámu þeir til boðsins, ok var þeim Illuga ok sonum hans skipat í öndvegi, en þeim Þorsteini Egilssyni ok Hrafni, mág hans, ok sveitinni brúðguma í annat öndvegi gegnt Illuga. Konur sátu á palli; ok sat Helga hin fagra næst brúðinni, ok renndi opt augum til Gunnlaugs; ok kemr þar at því sem mælt er, at *eigi leyna augu, ef ann kona manni.* Gunnlaugr var þá vel búinn, ok hafði þá klæðin þau hin góðu, er Sigtryggr konungr gaf hónum; ok þótti hann þá mikit afbragð annarra manna fyrir margs sakir, bæði afls ok vænleiks ok vaxtar. Lítil var gleði manna at boðinu.

1. *Give the principal inflectional parts of* búast, bauð, gekk, svarar, fara, skal, þrá, lát, vitir, görðu, kvámu, sátu, ann, *and* þótti.
2. *The derivation of* bóndi, frændi, ekki, eigi, aldri, mælti, öndvegi, leyna, afbragð, *and* gleði.
3. *The composition of the names* Þorkell, Gunnlaugr, *and* Illugi.
4. *Inflect through all cases of the singular and plural the phrase* Helga hin fagra.
5. *Explain the use of the pronoun in the phrase* þeim Þorsteini Egilssyni ok Hrafni.
6. *Give an account of the word* guma *in* brúðguma.
7. *What makes the vowel in* nú *long?*
8. *Give the changes caused by the* i-*umlaut and the* u-*umlaut, and illustrate them as fully as possible from the above passage.*

II.

Translate from *Hómers Odysseifsdrápa* (Book ix):—

En er sól var runnin og rökkur á komið, lögðum vér oss til svefns

á sjávarströndinni. En er hin árrisula, rósfingraða Morgungyðja kom í ljós, setti eg þing, og mælti í áheyrn allra :—" Mínir kæru félagar! þér skuluð nú vera hér eptir, en eg ætla að fara með skip mitt og lagsmenn mína, og vita, hverir menn þetta eru, hvort þeir eru ofstopamenn, villimenn og ójafnaðarmenn, eða gestrisnir menn og guðhræddir." Að því mæltu steig eg á skip, og bað förunauta mína fara upp í og slá skutfestum. þeir gengu þegar á skip og settust á þópturnar; og þegar hver var kominn í rúm sitt, lustu þeir árum hinn gráa sæ.

1. *Make a list of the words which would be differently spelt in Old Icelandic.*
2. *The principal parts of* runnin, setti, steig, bað, slá *and* lustu.
3. *The English cognates of* svefn, félagar, steig; *the German cognates of* nauta *in* förunauta *and of* og.
4. *Inflect* sjávar *in* sjávarströndinni.
5. *Explain the form* settust *and the derivation of the suffix.*
6. *Give the various possible significations of* á *as particle, verb, noun, etc.*

III.

Write out in prose the following stanza, and translate :—

Mana gramr við mik
(Venr hann gjöfli sik
þess man grepp vara)
Gullhring spara.
Segi hildingr mér,
Ef hann heyrði ger
Dýrligra brag;
þat er drápulag.

1. Give the name of this measure and explain its construction.
2. Explain fully the suffix *a* in *mana*.

IV.

Point out the *hendingar* and alliterative letters in the following :—

Lagðak orms at armi
Arms góða mér tróðu
(Guð brá Lofnar lífi
Lins) andaða mína.
þung var þorna spangar
þraut, en humra brautar
þó er beiðanda biða
Bliks þungara miklu.

1. **What is** the name given to the above measure?
2. **What** name is given to the verse in the stanza **beginning**

Roðit er sverð, en sverðan
Sverðrögnir mik gerði—

V.

1. *Write a brief résumé of the* Gunnlaugs Saga.
2. *Give the principal dates and incidents in the life of* Ari Þorgilsson; *of* Snorri Sturluson; *of* Sturla Þórðarson.

IV. ANGLO-SAXON AND ENGLISH LITERATURE.—PROFESSOR CORSON.

I. ANGLO-SAXON.

Give synopses of case-endings of the three declensions of nouns and of the definite and the indefinite declensions of adjectives. Give the plurals fisc, dæg, cræft, beáh, wíf, sceáp, heafod, bebód, fæt, spere, and the rules they follow. Decline bóc, bróðor, burh, cú, lús, mann, modor, turf, sunu. Decline, definitely and indefinitely, smæl, glæd, fæst, fæger, éce, grim, hálig, heáh, hræð. Compare strang, eald, geong, sceort, sófte, heáh, yfel, mycel, lytel. Decline, as possessive adjective pronouns, the genitives singular, dual, and plural, of the personal pronouns ic and þú. Give synopsis of the inflections of strong verbs. Give the parts of the verb that have the same root-vowel. Give the changes the root-vowel of the 1st pers. pres. indic. undergoes in the 2d and 3d pers. when the vowel of the endings -est and -eð is syncopated, and give the euphonic consonantal changes and omissions which then take place. Conjugate beorgan, yrnan, ceósan wesan, beón, dón, willan, habban, ágan, cunnan, witan. Give synopsis of the inflections of weak verbs. State peculiarities of the different classes of weak verbs and the euphonic consonantal changes and omissions which their conjugations present. Explain and give several examples of the use of the dative infinitive.

Read and Translate:

He sæde ðæt Norð-manna land wære swýþe lang and swíðe smæl. Eal þæt his man áþer oððe ettan oððe erian mæg, þæt lið wið ðá sæ; and þæt is þeáh, on sumum stówum, swýðe clúdig; and licgað wilde móras wið eástan, and wið upp on emnlange þæm bynum lande. On þæm mórum eardiað Finnas; and þæt byne land is eásteweard brádost, and symle swá norðor swá smælre. Eástewerd hit mæg bión syxtig míla brád, oþþe hwéne brædre; and middeweard þritig oððe brádre; and norðeweard, he cwæð, þær hit smalost wære, þær hit mihte beón þreora míla brád tó þæm móre; and se mór syððan, on sumum stówum, swá brád swá man mæg on twám wucum oferféran; and, on sumum stówum, swá brád swá man mæg on syx dagum oferféran.

Explain construction of "his," in "Eal þæt his man." Explain "áþer oððe . . oððe; wið upp on emnlange; symle swá norðor swá smælre." What modern English phraseology is derived from A. S. construction like "syxtig míla brád?" Explain "hwéne."

2. CHAUCER.

1. Give the usual noun-declensions of Chaucer's English.

2. How is the definite form of adjectives distinguished from the indefinite? Give examples of the two forms. What definite adjectives are generally used without the distinctive endings? Examples. What is the usual plural form of adjectives? What adjectives usually drop the distinctive plural ending?

3. Give the usual inflections of weak verbs in the indicative mood, pres. and past tenses. What verbs end in *-t* in the third person sing.? Examples of each.

4. How do strong verbs form their past tense and their past participles? Past plural? Examples of each.

5. Give the inflections of the subjunctive mood, pres. and past tenses, sing. and pl.

6. Inflections of the imperative mood, sing. and pl.? Give examples. Infinitive endings? Examples. Which of the infinitive endings is most used? What generally determined the use of the other endings?

7. What two participial endings were in use in the English of the XIVth century? Which was generally used by Chaucer, and which by Gower?

8. How are adverbs formed from adjectives? from nouns? What is the usage of the language in regard to the employment of negatives, especially when emphatic? Give examples of the negative united with the verb.

9. In what respect did the accentuation of the English of the XIVth century differ from that of the present English?

10. State the various endings and inflections of the Anglo-Saxon of which the final *-e* of Chaucer's words is a residual or a representative.

11. What are the general rules in regard to the syllabic value of the final *-e* in Chaucer's verse?

12. Scan the following verses, and explain where the final *-e* is sounded, and where it is mute:

V. 38. To telle yow alle the condicioun.
53. Aboven alle naciouns in Pruce.
90. All ful of fresshe floures, white and reede.
102. At that tyme, for him lust ryde soo.
132. In curtesie was sett al hire leste.
148. But sore wepte sche if oon of hem were deed.
183. And I seide his opinioun was good.
221. Full sweetly herde he confessioun.
235. And certayn he hadde a mery noote,
249. And overal, their eny profyt schulde arise.
311. A Sergeant of Lawe, war and wys.
341. An househaldere, and that a gret, was he.
385. He cowde roste, sethe, broille, and frie,
Make mortreux, and wel bake a pye.

417. He kepte his pacient wondurly wel.
535. And thanne his neighebour right as himselve.
557. His nose-thurles blake were and wyde.
A swerd and a bocler baar he by his side.
567. A gentil Maunciple was ther of a temple.
767. For trewely comfort ne merthe is noon.
823. Ye woot youre forward, and I it you recorde.

III. ENGLISH LITERATURE.

NO. I.

[*Each student will receive four or five connected questions, the answers to which are to be embodied in an Essay written during examination hours. The literary merits of the Essay, as well as the correctness and fullness of the answers given, will be taken into account.*]

1. Name the chief literary productions of the 14th century that claim the student's special attention.

2. What is the character of the Vision of William concerning Piers the Plowman? In what does its great historic value consist?

3. What dogma of the church was the special object of Wyckliffe's condemnation?

4. What are the literary merits of the Wyckliffite versions of the Scriptures?

5. What previous attempts at vernacular translation had been made in England?

6. What influence was exerted by the Wickliffite versions, upon subsequent versions?

7. What noteworthy circumstance in the history of the literatures of Protestant countries, is connected with the translation of the Scriptures into the vernacular?

8. What qualifications did Chaucer possess for becoming a great national poet?

9. What were the chief obstacles to his continued popularity, after the close of the 14th century?

10. What dramatic advantages has the plan of the Canterbury Tales over that of the Decameron of Boccaccio?

11. How is the literary dearth of the 150 years succeeding the death of Chaucer, to be partially accounted for, and upon what was the best productive mind of the nation during that time chiefly expended?

12. Who were the principal poetic representatives of this period? State what you know about them and their works.

13. What are the claims of the Earl of Surrey to his rank in English literature?

14. What is the character of "The Mirrour for Magistrates"? By whom was it planned and what did he contribute to it?

15. In what grand respect did Spenser differ from his cotemporaries and his immediate successors, especially Shakespeare?

16. Define the terms Classical and Romantic as applied to the two schools of literary art which, in Spenser's time, in England and on the continent, were struggling for the ascendency.

17. How may the Faerie Queene be characterized in respect to its relation to the two schools of literary art, the Classical and the Romantic?

18. What influence has been exerted by Spenser on English poetry, and in which of the modern poets is his influence most apparent?

19. State the chief distinguishing characteristics of Shakespeare's dramatic art.

20. In what does his great superiority to Jonson in the delineation of character, chiefly consist?

21. Upon what principle does Shakespeare seem to have proceeded in always working upon the basis of a previously existing story or play? And in thus working, how does his genius especially show itself?

NO. 2.

1. Give the four distinct periods into which Milton's authorship may be divided.

2. What were Milton's views as to the qualifications of a great poet?

3. State Macaulay's theory as to the requisites of success in the exercise of poetic genius.

4. What do you understand by a poetic reflection of an age? And why are great poets the truest historians?

5. What is it that makes Milton the great central figure of his age?

6. Compare Dryden with Milton as a reflector of his age.

7. Give an account of "the Collier Controversy."

NO. 3.

1. What was the occasion of Pope's Rape of the Lock? What were Pope's models in its composition?

2. State the relations of the poem to Pope's time.

3. In what form of poetry did the spirit of his age find its best embodiment?

4. Give an account of the Ossian controversy.

5. What good influence was exerted upon English poetry by Bishop Percy's Reliques?

6. State as fully as you can what you consider Cowper's relations to have been to the great revival in English poetry.

7. Trace succinctly the progress of the revival and the opposition it met with up to its culmination in Wordsworth.

4. CRITICAL READING.

MILTON'S LYCIDAS.

Give the occasion of the composition of the poem, and analyze

its structure. Explain as minutely as possible the ecclesiastical allegory running through it. In what different senses have the five opening lines been understood? v. 1, force of "yet?" v. 3, "crude," original meaning? What other English word has the same root? v. 6, "sad occasion dear;" give several other examples from Milton of this arrangement of epithets. Explain "dear." Give examples from Shakespeare of this use of the word; Craik's explanation? Horne Tooke's etymology? v. 7, "Compels," why used in the singular? "to disturb your season due?" Explain. v. 8, "Lycidas;" where did Milton get this name for his shepherd, and why did he probably choose it? Etymological meaning of the name? v. 11, "rhyme;" correct etymology of the word? Why was the "h" introduced in the spelling? v. 13, "welter;" etymology of word? What other English verbs have the same root? "to," force of? Give other examples from the poem, of this use of the word. In what present English phrases is it still so used? v. 14, "melodious tear," explain. v. 20, "lucky words;" explain the epithet. v. 22, "sable shrowd," explain; etymology of "shrowd?" v. 23, *et seq.*, explain biographical allusion. v. 33, "oaten;" what form have adjectives in -en given place to in present English? What change in meaning have those that are retained, undergone? v. 38, "must," force of? v. 47, "wardrop," what is the usual order of the elements of a compound word? How is the order in "wardrobe" accounted for? v. 49, "such," force of? v. 55, "wisard," propriety of the epithet? original force of -ard? usual present force? Give other examples. In what word has it been corrupted? v. 59, "inchanting," explain the epithet. v. 61, "the," force of? v. 64, "boots," etymology of word? "uncessant." What is the present rule in regard to the use of un- and in-? v. 64–69, explain the allusion. v. 67, "use," modern use? v. 75, "Fury," how does the poet use the word here? v. 76, "life," what figure? v. 79, "in the glistering foil," construe. v. 81, "by," force of? v. 82. "perfet," explain the form. v. 85, "honour'd," explain the epithet. vv. 87, 88, explain. v. 90, "in Neptune's plea," explain. v. 93, "every," etymologically = what? difference between the uses of "each" and "every?" v. 97, "was stray'd," what distinction was formerly observed in the use of *be* and *have* as auxiliaries? Difference between "is come" and "has come?" v. 101, "th' eclipse," force of "the?" "with," force of? v. 103, "went," what would be used in present English? Derivation and original sense of "went?" v. 104, what is the allusion? v. 106, "Like," construe. v. 110, "twain," three uses of, in Elizabethan English? v. 111, "amain," etymology, and force of the word here? v. 112 "bespake," give other examples from Milton of this use of the word; what force has be- in present English? v. 114, "Anow," difference, originally, between the use of "enow" and "enough?" v. 119, "Blind mouthes!" Is Hale's explanation acceptable? What other explanation would make the expression more poetic? v. 120, "the least," construe. v. 121,

"faithfull," what has probably caused the dropping of one l in present spelling? v. 123, "list," its derivation and earlier use? In what word does it survive? And to what other word is it akin? v. 126, "draw," in what form is the word still used in this sense? v. 129, "and nothing sed," explain construction of this phrase. vv. 130, 131, to what are these two lines generally understood to allude? but what is their more probable meaning? vv. 132, 133, "Return, Alpheus, ... return, Sicilian Muse," explain. v. 134, "bid them hither cast," what is involved in "hither?" v. 138, "swart star," force of epithet? v. 140 "quaint," etymology, and force of here? v. 142, "rathe," what form of this word is still in use? What other form is found in Shakespeare and earlier writers? Where has Tennyson used "rathe?" v. 149, "his:" give history of the present neuter genitive "its." v. 151, "laureat herse," explain "herse," and give examples of its earlier use; explain the epithet. v. 152, "so," force of? v. 158, "monstrous" =what? v. 159, "moist vows," develop; v. 160, "fable of Bellerus old," what rhetorical figure? vv. 161–163, explain the ecclesiastical meaning of these lines; "ruth," in what modern English word does it survive? in what verb? explain the form. v. 166, "your sorrow," what rhetorical figure? Give examples of other abstract nouns used in a concrete sense; examples from the Latin and Greek; v. 173, "that walk'd the waves," after what class of intransitive verbs was it common in Elizabethan English to omit the preposition? Give examples from Shakespeare. What difference in meaning is there in "walk'd the waves" and "walk'd on" or "walk'd o'er the waves?" Which is the more poetic, and why? v. 176, "unexpressive," explain the use of adjectives in -ive and -ible, in Elizabethan English, and give examples, from Shakespeare, of such adjectives used in a passive and in an active sense; v. 184, "thy," personal, or possessive adjective pronoun? "good," force of? Any like use in modern English? v. 185, "that wander in that perilous flood," what force has "in" here, different from what "on" or "o'er" would have? v. 186, "uncouth," radical and derivative meanings? meaning here? v. 189, "thought," force of? "Dorick," explain the epithet; v. 190, "stretch'd out all the hills," explain; what equivalent expression in Virgil's Eclogues? v. 192, "twitch'd," explain; "blew," why this epithet? v. 193, explain this verse.

V. MATHEMATICS.

[*The subjects in this department are distributed among the several Professors differently during successive years.*]

I. ALGEBRA—PROFESSORS BYERLY AND WAIT.

1. Find all the commensurable roots and one incommensurable root of the equation $x^5 - 4x^4 + 13x^3 - 47x^2 + 80x - 44 = 0$.

2. Find a formula for the sum of n terms of an arithmetical progression by making it depend on the $(n+1)$st term of a new series, and show that your formula is identical with the one found by the usual process.

3. Find the logarithm of 8608; interpolating in your table by the aid of the formula for the $(n+1)$st term of a series.

4. Develop $\sqrt{1+x}$ into a series by the binomial theorem, and also by the method of undetermined coefficients.

5. Compute the logarithm of .002, to the fourth approximation by the method of continued fractions.

6. Calculate by logarithms the value of the expression

$$\sqrt[10]{\left[\frac{(4.275)^3 + \sqrt[4]{26.41} \times 0.0832}{0.09628 \times \sqrt{\frac{623}{1786}}}\right]^7}$$

2. TRIGONOMETRY—PROFESSORS ARNOLD AND WAIT.

1. Define the six principal trigonometric functions of ϑ, as *ratios* and extend the definitions to the case of angles $<0°$ and $>90°$. Find eight fundamental relations among them, *for all values of* ϑ. Obtain $\sin\vartheta$ in terms of $\tan\vartheta$.

Show what lines, drawn to a circle whose radius $= 1$, have the same values as the trigonometric functions or ratios. In what sense can a line and a ratio be said to have the same value?

Write out the six functions of $-\vartheta$, $\frac{1}{2}\pi \mp \vartheta$, $\pi \mp \vartheta$, $\frac{3}{2}\pi \mp \vartheta$, $2\pi \mp \vartheta$, $-5\pi \mp \vartheta$, in terms of those functions of ϑ which express them most simply. What relation has this problem to the mode of using trigonometric tables?

Give the six functions, also versin, coversin and suversin, of the following angles: 0°, 60°, 120°, 225°.

2. Write formulæ for $\sin(\alpha \pm \beta)$ and $\cos(\alpha \pm \beta)$. How do you know that these formulæ are true even when α and β are not between 0° and 90°? Illustrate by the case of $\sin(\alpha+\beta)$.

Proceeding from these, find formulæ for $\tan\frac{1}{2}\vartheta$ and for

$$\frac{\sin\gamma + \sin\delta}{\sin\gamma - \sin\delta}.$$

3. In quadrilateral $ABCD$, let $AB = 80$, $BC = 70$, $CD = 60$, $DA = 50$, $AC = 40$; and find BD. Use four-place logarithms; and estimate, roughly, the degree of accuracy in your result.

4. State Napier's rules for spherical right triangles; and demonstrate, using Evans's method.

5. Find, in nautical miles, the length of the shortest path from a point off Cape Horn, in 57° S. lat. and 67° W. long., to a point in 43° 15′ S., 147° 30′ E. off Hobarton. In sailing upon this track, how must I steer at first?

3. PLANE ANALYTIC GEOMETRY.

1. The centre of gravity of two heavy points is known to divide

internally the line that joins them, in the inverse ratio of their weights. Let the points P_1, P_2, P_3 have the weights m_1, m_2, m_3; and let the point P_{23}, at the centre of gravity of P_2 and P_3, have the weight $m_2 + m_3$, and similarly with P_{31} and P_{12}. Prove that P_1 and P_{23} have the same centre of gravity as P_2 and P_{31}, or as P_3 and P_{12}.

What properties of plane triangles can you deduce from this; and what theorems concerning centres of gravity for many bodies?

2. Rectangular equations of two lines; the first containing point $(-2, 3)$ and making the angle $-45°$ with axis OX; the second, containing points $(2, 3)$ and $(-4, -6)$.

Distance of each line from the origin; intercepts on the axes; distance of the lines' intersection from point $(1, 1)$; tangent of their angle of inclination.

Transform the lines' equations to oblique coordinates whose axes make angles $+30°$ and $+60°$ with OX, and whose origin is $(1, 1)$; also to polar coordinates whose origin and axis are O and OX.

3. Rectangular and polar equations of the circle that contains points $(0, 0)$, $(1, 7,)$ $(7, -1)$. Show when its radius vector becomes negative, and interpret this result.

4. Prove that the tangent at any point of an ellipse or hyperbola is equally inclined to the two lines from that point to the foci. What is the corresponding theorem for the parabola, and why?

5. Prove that every equation of the second degree represents an ellipse, a parabola, a hyperbola or right lines.

6. Through a fixed point O passes a moving line that cuts a given hyperbola in points P', P''. Find locus of that point P on the line, which divides $P'P''$ harmonically with respect to O.

4. SOLID ANALYTIC GEOMETRY—PROFESSORS BYERLY AND WAIT.

1. Find, by projections, the cosine of the angle between two lines, in terms of the lines' direction-cosines.

2. Write the equation of the plane, in four of the most important and dissimilar forms; interpret each, and show whether it extends to oblique coordinates, and how obtained.

3. Find the shortest distance between two non-intersecting diagonals of adjacent faces of a given cube.

4. Locus of equations $U = V = W = 0$; of $U = VW = 0$; of $U + k.V = 0$; of $UV + mUW + nVW = 0$; where $U = 0$; $V = 0$, $W = 0$ represent any surfaces.

5. Classify the surfaces $Ax^2 + By^2 + Cz^2 + 2Lx + 2My + 2Nz = 0$, by referring to new coordinate axes so as to simplify their equations.

5. HARMONOID GEOMETRY.

(*Use symmetric methods by preference.*)

1. By theory of permutations, how many essentially different

harmonoid ratios are determined by four given elements? Show that each of these ratios fixes all the others unambiguously; and utilize this in defining homography.

Show that either harmonoid of a pencil, if defined by the aid of the sines of the angles, is independent of the choice of positive direction on either ray; and that the above discussion applies to such harmonoids.

Prove that a pencil of $2n$ rays cuts any transversal homographically. Resulting theorem for two pencils or ranges, and its converse. Cases where one intersection is at infinity, and where two corresponding elements are identical. Methods of completing a pencil or range homographically to another.

2. Distinguish descriptive from metric relations. What classes of either are projective, and why?

Prove that any four tangents to a conic meet any fifth tangent in a range homographic to the pencil of rays that join the four points of contact to any fifth point on the curve.

3. Obtain and reciprocate Pascal's theorem.

Given five points on a conic, draw a tangent at either; also find where the conic meets a given line through either point. Reciprocate these problems.

Through a given point, draw a line to the unseen intersection of two given lines.

4. Establish the fundamental theorems of involution by Evans's method, from the properties of the completed quadrilateral.

6. CALCULUS—PROFESSOR OLIVER.

ONE-TERM COURSE.

1. Define Curvative, Osculating Circle, Radius of Curvature, Centre of Curvature, Evolute. What are the two most important properties of the evolute of any curve?

2. Find the length of the radius of curvature of the curve $x^2 = 4y$ at the point whose abscissa is 2.

3. Find at what point of the curve $x^2 = 4y$ the radius of curvature will be a minimum.

4. Give the reasoning in full of the method of determining by integration the centre of gravity of a parabolic segment.

Example.—Find the coordinates of the centre of gravity of the segment of the parabola $y^2 = 2mx$ cut off by the double ordinate through (x_1, y_1).

7. CALCULUS—PROFESSORS OLIVER AND BYERLY.

FULL COURSE, EXTENDING THROUGH THREE TERMS.

1. Explain the terms "limit," infinitesimal," "order of infinity," "derivative," "differential" or "virtual increment," "difference" or "increment."

Compare the method of limits, that of infinitesimals, and Lagrange's; and show that all three are rigorous.

Show that integration, defined as a certain limiting case of summation, is the inverse of differentiation. Explain its relation to the arbitrary or undetermined constant, and the theory of definite integrals.

Likewise illustrate all the above topics by aid of a curve, or of a moving point.

2. Show that $\lim (1 + i)^{\frac{x}{i}}$ can, by assigning a suitable law to the infinitesimal i, be developed by the binomial theorem for positive integer exponents; and that it converges.

Obtain the derivative of ϵ^x; of $\log x$.

3. Differentiate $\sin^{-1}\dfrac{a+b \sin 3\sqrt{x}}{b+a \sin 3\sqrt{x}}$.

4. Express $D_x{}^2y$ in terms of derivatives of x with respect to y.

5. Write Taylor's Theorem in two forms. Develop $\sin x$ and $\cos x$. Obtain De Moivre's formulæ, and describe the six hyperbolic functions.

6. Investigate the conditions for a maximum or minimum in a function of two variables. Apply to the function $xy(1 - 2x - 3y)$.

7. Prove that at any point of a surface the sum of the curvatures of mutually perpendicular normal sections is constant.

8. Integrate $\dfrac{dx}{a^2-x^2}$ into both logarithmic and hyperbolic forms.

Obtain the integral $\displaystyle\int\frac{dx}{x} = \log x + C$ from the general form of $\displaystyle\int x^m dx$.

9. Integrate $\dfrac{2+3x}{(x^2-x+1)^2}\, dx$.

10. Show how to integrate every rational function of x and $\sqrt{(ax^2 + bx + c)}$, by introducing an auxiliary angle.

11. Show when $x^m(a + bx^n)^p dx$ is integrable. Explain the methods of reduction by which either m or p can be increased or diminished.

12. Integrate $(ax + by + c)dx + (a_1x + b_1y + c_1)dy = 0$.

13. Obtain the singular solution of equation $a^2(dy^2 + dx^2) = (ydx - x\,dy)^2$; and explain the relation of singular solutions to envelopes.

14. Find the orthogonal trajectories of the system of circles with a common chord, $y^2 + x^2 x - 2a = b^2$; where a varies.

8. DESCRIPTIVE GEOMETRY.

[*Students, in all the courses, are admitted to the class in Descriptive Geometry as optional students. But the study is required in the course in* ARCHITECTURE, CIVIL ENGINEERING,

and in MECHANIC ARTS. *The subject is taught under the supervision of the Professor in Civil Engineering.*]

I. FIRST TERM.

2. Find the angle an oblique plane makes with the ground line.
3. Through a line draw a plane perpendicular to a given plane.
6. Draw a plane tangent to a cone and parallel to a given line, the axis of the cone being in the ground line.

II. SECOND TERM.

1. Find the projections of a cone, having a circular right section, when taken oblique to the planes of projection; and the development of the surface between the vertex and the horizontal plane.
2. Find the intersection of a plane with a cylinder having its axis in the ground line.
6. Given one element of the first, and three of the second generation, of a hyperbolic paraboloid—the element of the first generation passing through the vertex of the surface—and a plane, containing the element of the first generation; to find the point where the plane is tangent to the surface.
7. A village lot is divided into squares, and the references of the corners determined; find the cut or fill at each corner, and the number of cubic yards of earth to be removed to reduce the surface to a given uniform grade.
9. Through a line pass a plane perpendicular to a given plane and find its scale of declivity.
10. Draw a normal line to the skew arch soffit at a given point of the surface.

VI. NATURAL HISTORY.

I. PHYSIOLOGY—PROFESSOR WILDER.

1. State the chemical resemblances and differences between butter and sugar.
2. State the general object of digestion.
3. State the functions of the pancreatic juice.
4. Define tidal air and state its average amount.
5. Make a diagram of gray and white nervous tissue: state where they occur and their properties.
6. State the difference between plasma and serum.
7. Give a diagram of both sides of the heart; indicate the source, nature and destination of the blood currents.
8. Give a diagram of the hepatic circulation; indicate the source, nature and distribution of the blood, and the changes produced by the liver.
9. State the difference between coma and syncope, and indicate their treatment.

10. Name three common clothing stuffs in the order of their protection against cold.

11. Give a diagram of a vertical section of the skin.

12. State the effect of irritating the anterior root of a spinal nerve *inside* of a section through it.

13. Name the essential ganglia of the brain in their order from behind forward.

14. Give a diagram of the tympanum and its contents.

15. State the structure, position and properties of the "blind" and the "yellow" spots upon the retina.

2. PHYSIOLOGICAL BOTANY—PROFESSOR PRENTISS.

1. What are the essential characters of a typical flower?
2. Explain the theoretical structure of the pistil.
3. Distinguish between free and distinct, cohesion and adhesion, pinnate and pinnatifid.
4. Explain the structure of a flower of Compositæ.
5. In what plant is the greatest amount of pollen secreted? Why?
6. What is assimilation? Where and under what conditions does it take place?
7. Show that a flower is homologous with a branch.
8. State some of the distinguishing characteristics between Trillium grandiflorum and T. erectum.
9. Mention ten trees indigenous to New York, and state the Natural Order to which each belongs.
10. What change in structure would convert a raceme into a corymb?
11. State the leading botanical characters of each of the following orders: Rosaceæ, Leguminosæ, Crucifera, Ranunculaceæ.
12. Define Genus, Species, Order. State the origin of generic, specific, and ordinal names.
13. Draw diagrams to show: 1. Ovary free. 2. Ovary adherent. 3. Excurrent stem. 4. Versatile anther. 5. Introse anther. 6. Imbricate æstivation. 7. Valvate do. 8. A petiolate, ovate, cordate, serrate leaf with stipules.
14. Characterize the different kinds of plant tissue.
15. Name six natural orders largely represented in the flora of Ithaca.
16. What are four of the most important orders in temperate regions in regard to their useful products?
17. Explain some structural provisions in plants which aid in their dissemination.
18. What substances constitute the principal food of plants?
19. Describe the different shapes of monopetalous corollas.
20. Explain the terms diœcious and monœcious.
21. Give examples of common diœcious plants.
22. How do ordinary tendrils act?

23. Of what advantage is it to a plant to climb?
24. Explain the general structure of a leaf.

3. ZOOLOGY—PROFESSOR WILDER AND MR. COMSTOCK.

1. What kinds of groups are usually admitted among animals?
2. Characterize the Vertebrates.
3. Characterize *Amphioxus.*
4. Give a longitudinal section of *Amphioxus.*
5. Give a longitudinal median section of the branchial region of *Petromyzon* (the lamprey).
6. Characterize the larval form of *Petromyzon.*
7. Give the geographical distribution of the existing Ganoids, including the Dipnoans.
8. Give in three vertical columns the constant and peculiar characters of the Ganoids, Selachians, and Teleosts.
9. Describe and figure the development of a frog.
10. Describe peculiar forms of gestation among Batrachians.
11. Give a diagram of a frog's brain from above.
12. State the resemblances and differences between Reptiles and Birds.
13. Name fossil forms which seem to connect the two classes.
14. Characterize the Mammals.
15. Give a diagram of an embryo opossum.
16. Name and give an account of the simplest organism known.
17. Describe the development of a free-swimming medusi-form reproductive bud.
18. Give an account of the coral-making *Zoantharia,* noticing especially the following points:—Relation of coral to body of polyp, modes of reproduction, forms of coral communities as resulting from different modes of increase or growth, and the distribution in latitude, and in depth, of the reef-building species.
19. Give an account of the Pork Tape-worm of man, (*Taenia solium*).
20. Characterize the Spiders, (*Araneida*).
21. Give tabular arrangement of the typical mouth-parts of an insect.
22. Explain the terms, larva, pupa, chrysalis, complete metamorphosis and incomplete metamorphosis.
23. Describe a fresh-water Polyzoon.
24. Discuss the zoological position of the *Brachiopoda.*
25. Describe shell of an *Orthoceras.*

GENERAL GEOLOGY—PROFESSOR COMSTOCK.

1. Give concise review of oceanic and atmospheric currents, as influenced by configuration of land.
2. Modes of origin of rocks, with varieties of texture.
3. Explain "cycles of deposition."

4. Give proofs of slow movements in the earth's crust.
5. Outline the prominent theories of mountain elevation.
6. Nature and effects of Metamorphism.
7. Name the geological period in which each of the principal North American mountain chains was elevated.
8. Causes and effects of hot springs and geysers.
9. Brief resumé of effects produced by organic agencies.
10. Name, in the order of relative importance, the classes of animals and plants represented in each geological age.
11. Review briefly the history of the Azoic and Eozoic ages.
12. Brief account of the life of the Trenton Period.
13. Review the life of the Devonian Age.
14. Review the life of the Mesozoic Era.
15. Give the evidence in support of the glacial theory.
16. Classify the epochs of the Pre-Historic Era, showing stratigraphic equivalents, and giving characteristic relics of each epoch,
17. Describe the remains of *pfhlbaaten* and *kjökken-mödding*, giving geographical distribution of both.
18. Give an outline of North American Archæology.
19. Say all you can about the *Champlain Period* in America.

VII. MORAL AND INTELLECTUAL PHILOSOPHY.—PROFESSOR WILSON.

[*The examinations in this Department are conducted by means of a Syllabus of the lectures on each subject, the questions and topics of the Syllabus are divided into sets, with five or more in a set, one of which is drawn by lot by each student at the time of the examination, and the answers and discussions are written in the presence of the professor. The following are given as examples, only two or three from each Syllabus:*]

I. PSYCHOLOGY.

I.

1. What is the relation of the Body to the Mind?
21. What is Materialism in relation to Psychology?
41. What is false perception, and on what conditions may it occur?
61. What are the appetites, and how are they related to the excito-motor emotions?
81. Explain the difference between the æsthetic and the ethic emotions in reference to their origin.
101. What is the difference between volition and choice?

VI.

6. Describe and name the ganglia of the sensorium.
26. Can voluntary action be distinguished from involuntary action by the mere observer? Why not?

46. What are the reasons for regarding the optic thalami as the organ of the sense of touch?

66. How are affections influenced by the voluntary control of thought?

86. What reason is there to suppose that the emotions of self are influenced by difference of physical organization?

106. State the changes in the character of the life of an individual as he passes from infancy to old age.

XIX.

19. What influence have the excito-motor and the sensori-motor emotions upon the character and habits of life?

39. What would be our condition in relation to knowledge of external objects, if we had no sense of touch?

59. Explain the four processes by which nouns as names of things are formed.

79. What are sentiments? and how do they differ from judgments?

99. Why cannot we prove as a matter of fact that animals have volition?

119. What changes take place in the character of memory as we pass from childhood to old age?

2. MORAL PHILOSOPHY.

[*Each student writes an essay on one of the following topics drawn by lot at the time of writing it:*]

1. The nature and limit of Moral Action.
2. The influence of theories of Morals on character.
3. The Moral character of Acts as distinct from the Guilt or Innocence of the Agent.
4. Reflex-action in its relation to Freedom of Will.
5. Æsthetic Culture and its relation to Morality.
6. Benevolence as a Sentiment and as a Principle.
7. The Duty of Truthfulness and the extent of its obligations.
8. The Duty of Justice as between Man and Man.
9. The Rights of the State as against Subjects.
10. Citizenship as a Natural Right.
11. Religion as a Natural Duty.
12. In cases of conflict of Duties, what general rules may be given as our guide in determining what is our Duty?

3. LOGIC.

I.

1. Explain the nature and province of Logic. What are its relations to Psychology?

21. What is the fallacy of Undistributed Middle? When will it occur? Why can there be no Universal Conclusion after a Partial Premise?

41. Explain what is meant by "the presumption," "the probability," and "the certainty of propositions." How many kinds or degrees of certainty are there?
Analyze and explain examples 6, 22, 99.

V.

5. What is synthetic reasoning? Why do we call it *a posteriori*? What are the four relations of things on which it depends?
25. What is a *Sorites?* How may its validity be tested (1) by reduction to syllogisms, (2) by general rules?
45. What are "examples?" what "exceptions?" and their relations to each other? Explain the method and fundamental principle of induction.
Analyze and explain Examples 5, 30, 114.

X.

10. When do separable accidents become essential? When essentia and differentia? What is artificial classification, and how does it differ from natural classification?
30. What are disjunctive syllogisms, and the ways of completing them? What is Excluded Middle?
50. Explain the relation of Logic to Rhetoric, and the difference between them in reference to argumentation.
Analyze and explain Examples 14, 53, 102.

XV.

15. Explain "immediate inference" by composition (§§ 93, 94.) What is the fundamental law in regard to the force of negatives?
35. What is Ambiguous Middle? Give and analyze an example. How does this differ from Undistributed Middle?
55. What is the difference between refuting one's *reasoning* and refuting his *conclusion?* How can the former be done? What is the effect of it?
Examples 18, 39, 115.

XX.

20. What is the Fallacy of Negative Premises? Why may there be no conclusion after two Negative Premises? Why no affirmative conclusion after one Negative Premise?
40. May a syllogism be at the same time a fallacy in form and in diction? What is necessary to detect a fallacy in diction? Why?
60. Explain the difference between direct and indirect refutation. What are the three kinds of indirect refutation?
Analyze and explain Examples 24, 45, 138.

4. HISTORY AND CRITICISM OF PHILOSOPHY.

V.

5. Describe and define the six classes of nouns: (1) individual,

(2) abstract, (3) general, (4) collective, (5) privative, and (6) negative.

25. Give an account of the Sophists; of Socrates; and the origin of the word "philosophy."

45. State Comte's objection to consciousness, as a means of knowledge. What would be the consequence of accepting it?

65. What is meant by the word "*faculty*," as applied to the mind? What influence has the philosophy of Reid had upon this use of words, and the views of the nature of the mind?

85. What is meant by calling God "the Absolute," "the Infinite," etc.? What is the law of the English language, in regard to the use of the article before adjectives? How does it differ from the Greek usage?

X.

10. What is the law with regard to the quality of nouns that may be connected by conjunctions? The reason for it?

30. To what department of Philosophy did Aristotle chiefly devote himself? What was his attitude in regard to Plato's theory of ideas?

50. What is "substance," as distinct from "property"? What are the three significations of the word "substance"?

70. Do we know the mind as object, or as cause only? Explain the difference?

90. What is Cousin's theory of "the origin of the idea" of God? What does he mean by calling God "the Universal Reason"? What inference may we draw from this, as to the nature of God?

XVII.

1. State some of the changes that may be made in propositions and show the analogy between this method and mathematical analysis.

2. What was Kant's theory of knowledge? What was Fichte's application of it to the external world?

3. In what sense is every object in nature "a cause"? in what "a force"? Are "cause" and "force" abstract or concrete terms when so used?

4. What was Cousin's theory of "ideas" in relation to the acquisition of knowledge?

5. Show that every object in nature and every state of an object may be regarded as a term in a series, (1) with regard to organic beings, (2) to inorganic.

XX.

1. State and illustrate the principle of identity and contradiction as a test of truth.

2. What is Sir William Hamilton's theory of knowledge—"presentative" and "representative"? What its relations to the materialism of Herbert Spencer?

3. Are there any "causes" or "forces" in nature besides material objects? What are "laws"—"the laws of Nature"?

4. What proof have we that the mind or soul is immaterial? What is the bearing of this on the doctrine of immortality?

5. What attributes do the acts of "creation" in the origin of "species" and "series" imply in the Beings who performed them? What influence does the certainty of such acts have on our expectations of a Special Providence and miraculous interpositions after creation was completed?

VIII. PHYSICAL SCIENCES.

1. CHEMISTRY.—PROFESSOR SCHAEFFER.

1. Explain the following terms:—atom, molecule, element, symbol, formula, atomic weight, molecular weight, equivalence.

2. What is meant by the law of definite proportion—law of multiple proportion? Give examples.

3. When the same elements unite in more than one proportion how are resulting compounds named?

4. What is a compound radical?

5. What is an acid? a base? a salt? How are they named?

6. What is a normal salt? What an acid salt?

7. Explain the relation between the density of a gas and its molecular weight. Give examples.

8. The molecular formula of a substance being given how may its percentage composition be obtained?

9. Give the distribution, preparation and properties of chlorine and sulphur.

10. Explain the process of combustion.

2. PHYSICS—PROFESSOR ANTHONY.

I. MECHANICS.

1. Define the terms (*a*) force, (*b*) work, (*c*) energy, (*d*) resultant and (*e*) component.

2. Define the terms (*a*) velocity and (*b*) acceleration.

3. A force of 8 kilogrammes acts toward the right, another parallel force of 6 kilogrammes acts toward the left at a distance of 12 c. m. from the first. Determine completely the resultant.

4. When a body is moved by a constant unbalanced force, (*a*) what is the nature of its motion? (*b*) What is the relation of the acceleration to the force and mass? (*c*) What relation between time and velocity acquired? (*d*) Between time and space passed over? (*e*) Between velocity and space?

5. A body A moves in the arc of a circle of 5 ft. radius with a velocity of 30 ft. A body B moves in a circle of one-half the radius with one-half the velocity. What is the ratio between the centrifugal forces developed?

6. (*a*) What is the relation between the ordinary and absolute units of force, if feet and seconds are the units of length and time respectively? (*b*) What if yards and minutes are the units of length and time?

7. What is the resultant of the forces 5 and 7 making an angle of 120°?

8. Find the centre of gravity of a circular disc of which one half is iron and the other half wood, joined along a diameter of the disc, the iron being 8 times as heavy as the wood.

9. (*a*) A mass of 100 lbs. moves with a velocity of 500 ft. What is its energy in ft. lbs.? (*b*) How far would it penetrate into a bank of earth offering a constant resistance of 100 lbs.?

10 How high will a body rise when projected upward with a velocity of 1000 feet?

11. How is the pressure due to the weight of a liquid computed?

12. State the principle of Archimedes.

13. (*a*) State Mariotte's law. (*b*) How can it be demonstrated experimentally?

14. Into what space will a quantity of air measuring 1 cu. ft. at the standard atmospheric pressure be compressed by a column of water 330 ft. high in an open tube (33 ft. = 1 atmosphere)?

II. ELECTRICITY AND MAGNETISM.

1. *a*. Describe the phenomena of statical induction. *b*. Apply to electrophorous and Holtz machine.

2. What are the general laws for the mutual action of electric currents? Apply to the case of a radial current flowing from the centre outward, acted upon by the earth current.

3. A Battery of 40 cells, each of 2 ohms resistance, and E. M. F. 1 volt, is arranged in series and the current divided between three telegraph lines, respectively of 3500, 7000, and 6500 ohms resistance. *a*. What is the entire external resistance? *b*. What is the entire resistance? *c*. What is the entire current? *d*. What current will flow through each line?

4. Describe the experiments to be performed to obtain the strength of a current in absolute measure.

5. *a*. Give the general law for the direction of an induced current. *b*. What current will flow through a vertical wire forming part of a closed circuit, when the wire is moved southward? *c*. When it is moved eastward?

III. HEAT.

1. What is meant by the coefficient of expansion of a body? Coefficient of apparent expansion of a liquid? In a centigrade thermometer, what must be the relation between the volume of the tube between 0° and 100°, and that of the bulb including that portion of the tube below 0°?

2. What is the theoretical velocity of air in a ventilating flue whose height is 50ft. and temperature 27° C., the external temperature being 7° C.?

3. Describe ebullition and the accompanying phenomena. What is the tension of the vapor from a boiling liquid? Effect of pressure on the boiling point. Why?

4. Water is compressed $\frac{45}{1000000}$ of its volume by a pressure of one atmosphere, what force will be required to resist the expansion for an elevation of temperature of 20°? coef. of expansion .00024.

5. Which has the greater density, air at 10° and pressure 70, or air at 30° and pressure 80?

6. What is meant by the "Spheroidal State?" State what facts you know in connection with it.

7. What is the unit of heat? What is specific heat? A body weighing 5 grammes is heated to a temperature of 100°, then plunged into 10 grammes of water at 10°, the common temperature finally reached is 12°. Required spec. heat of body.

IV. ACOUSTICS AND OPTICS.

1. (*a*) What is meant by a musical interval? Compute the intervals between the tonic and each note (*b*) of the major scale, (*c*) of the minor scale. (*d*) Point out the difference between the two scales.

2. Give the evidence that sound is propagated through the air by a vibratory motion.

3. *a*. What are laws of regular reflection of light? *b*. Where is the image caused by reflection from a plane mirror? *c*. Where is the image produced by a concave mirror, if the object is at an infinite distance? *d*. What changes will take place in the position and size of the image produced by a concave mirror, if the object approach from an infinite distance to very near the mirror?

4. *a*. What are the laws of refraction of light? *b*. Show in what way a prism deviates the rays. *c*. What is meant by the minimum deviation by a prism, and when does it occur?

5. *a*. State the evidence in favor of the undulatory theory of light. *b*. What evidence in relation to the direction of the vibration? *c*. How does a thin piece of selenite restore the light when placed between the polarizer and analyzer? *d*. How are the colors in this experiment accounted for?

3. ASTRONOMY—PROFESSOR POTTER.

I. Explain the difference between Sidereal and Solar days.

II. Explain the origin of the elements composing the Equation of time, and show the relation of that Equation to apparent and mean time.

III. Give the amount, and explain the cause of Precession, and show its relation to the Tropical year.

IV. Define the Sidereal, Anomalistic, and Civil years.

V. Show the relation of Aberration to the velocity of light, and to the Earth's orbital motion.

VI. Explain the method of computing the distance of an Inferior Planet by means of its greatest Elongation.

VII. Given the altitude of the Pole Star, to find the latitude of the place.

VIII. Compute the Longitude, Right Ascension and Declination of the Sun, any one of those quantities and the obliquity of the Ecliptic being given.

IX. Given the meridian altitude and Declination of a heavenly body, to find the latitude of the place.

X. Find the time by a single altitude of the Sun, and deduce therefrom the longitude of the place, by the chronometer.

XI. Deduce the value of the Lunar ecliptic limits, and show when an eclipse of the moon is impossible and when inevitable.

XII. Give Kepler's third law, and show the application thereof to the finding of the Sun's horizontal Parallax, by observing the transit of Venus.

IX. RHETORIC, ORATORY AND GENERAL LITERATURE—PROFESSOR SHACKFORD.

I. ENGLISH COMPOSITION.

FIRST YEAR, FIRST TERM.

1. How can an element of a sentence be expanded? Give an example.

2. What is meant by the Unity of a sentence?

3. What faults of construction detract from Strength of expression?

4. State what Rhetorical principles are violated in the following sentences:

(*a*) "When I attempt to make a nearer acquaintance through the medium of Danish, they are shy and shrinking to such an extent that they do not attempt to conceal it."

(*b*) His dormant affections quickly awakened to fasten themselves pertinaciously around the timely object. His thoughts began industriously to shape out for himself a new future, which should embrace, as a setting, its appropriate jewel, a brilliant and prosperous career for this young hope of his house.

(*c*) What Skimpole wished to appear, La Fontaine was; a self-unconscious humbug, the one; simple and without guise, the latter.

(*d*) She has lectured one hundred nights, traveled several thousand miles, and written a book on Ethics, and all within a year—which is doing well, if she is a woman.

(*e*) I never failed in a solitary case to far exceed the hopes of my class.

(*f*) It is well calculated to develop those rational faculties, which, in the old system, were left to develop themselves.

5. How is Simplicity a relative quality in the choice of words?

6. Construct a Periodic, and change it into a Loose, sentence.

7. Mention some of the ways of varying a sentence.

8. When are *on the contrary*, *on the other hand*, *conversely*, *obversely*, used as links between sentences?

9. Mention some of the methods of building up a paragraph.

10. Consider in detail the following paragraph in regard (*a*) to the construction of the several sentences; (*b*) to the choice of words; (*c*) to its conformity to the rules of the Paragraph:

(1) "The attempt has utterly failed, even when made under the most favorable conditions for success. (2) For instance, the French Academy, containing the great body of the distinguished literary men of France, once sought to exercise such a domination over their own language, and, if any could have succeeded, might have hoped to do so. (3) But the language recked of their decrees, as little as the advancing ocean did of those of Canute. (4) They were obliged to give way, and in each successive edition of their dictionary, to throw open its doors to words which had established themselves in the language, and would hold their ground, comparatively indifferent whether they received their seal of allowance or not."

2. ENGLISH COMPOSITION.

SECOND TERM.

I.

1. From what does Antithesis derive its force?

2. What is necessary to make a resemblance a Figure of Speech?

3. What conditions must be satisfied when a Figure of Similarity is employed to aid the understanding?

4. Exemplify the difference between the Antithesis and the Epigram.

5. State the chief means of attaining Brevity.

6. What principles of Arrangement aid the understanding of a complex statement?

7. What are the conditions in the employment of language to excite Pathetic emotion?

8. Explain what is meant by the permanent, and the variable element in Taste.

II.

9. From what does the Simile derive its force?

10. Mention forms of Antithesis in which the contrast is of a secondary kind.

11. State the nature and object of Fictitious Examples.

12. Explain the nature and effect of Innuendo.
13. How does Variety contribute to Strength?
14. Why do many scenes and works of Art please after frequent repetition?
15. How is the effect of Ludicrous degradation softened?
16. In what ways is language made to produce æsthetic effects?

III.

17. From what does Metonymy derive its force?
18. What conditions are necessary to render Metaphor a source of pleasure?
19. State the nature and limits of the Hyperbole.
20. What is the Identical assertion? Seeming Irrelevance? Extreme case?
21. State the three kinds of violation of Brevity.
22. Mention the conditions essential to Sublimity.
23. What are the elements that enter into Wit?
24. What are the conditions of Melody in the construction of clauses and sentences?

3. HISTORY AND ELEMENTS OF THE ENGLISH LANGUAGE.

FRESHMAN YEAR, THIRD TERM.

1. State briefly the foreign influences that have operated in the growth and development of English.
2. What Scandinavian peculiarities are found in English etymology and syntax?
3. What has brought about the dropping of inflections?
4. Indicate the character of the changes that have taken place since the 14th century.
5. What division into Periods is generally made?
6. What are the terminations of nouns that have come from the French?
7. Whence do we get the words *geology, seraphim, algebra, orrery, reynard, parchment, magnet, imp, snow, second, three, uncle, domestic, stentorian, amen?*
8. Give the reason in each case for calling the following words Anglo-Saxon: *good, go, old, quicken, knock, father, goose, sun, buzz, three, fourth.*
9. Why is an Anglo-Saxon style strong and picturesque?
10. Name some words where the noun is Anglo-Saxon and the adjective of foreign origin.
11. Explain *free-mason, beef-eater, grocer, brand-new, island, shame-faced, Charles' wain, twilight.*
12. What are the two great Landmarks of the Semi-Saxon period?
13. What is the explanation of synonymous words often used in pairs?

14. Explain the following forms: ***did, its, mine, here, once, him, whom, whilom, be*** and ***gain*** as prefixes.
15. Give the force of the adjective suffixes, ***y, en, ly, ed, ish, ern, ive.***
16. What is the relation between consonants in English and in German?
17. State the three ways of expressing the relation between the parts of a compound, with an example of each way.
18. Trace the origin of several particles.
19. State some of the causes of the anomalies in English orthography.
20. What are the peculiar characteristics of the verb?
21. Give the principal formatives of the verb, and their force.
22. To what can the substantive verb be traced back in all languages? Why called substantive?
23. Explain the auxiliaries ***may, can, shall, will, should, would, could, do.***
24. How does a foreign word become naturalized?
25. What principle operates in causing the change commented upon in the following words: "As the pupils grow older, they do not care to read about a fair lady, but they are at once drawn to a female possessing considerable personal attractions. A brawl is a word good enough for a scuffle between peasants; but between aldermen the brawl becomes a fracas. An emeute is a far genteeler word than a riot. A farmer prides himself upon being an agriculturist."
26. Make a list of the Anglo-Saxon words, and of those of French origin in the preceding quotation.
27. Make a list of the symbolic and the presentive words.
28. Indicate the terminations for causative, intensive, frequentative, and inceptive verbs.
29. What are the three kinds of syntax?
30. State the principal heads under which changes in words may be classified, with an example of each class.

4. RHETORIC.

FOURTH YEAR, FIRST TERM.

1. The Division of Arguments.
2. The Sign.
3. Concurrent Testimony.
4. The "Idola" of Bacon.
5. The Progressive argument.
6. Analogy.
7. Inductive and Syllogistic Reasoning.
8. The Burden of Proof.
9. The Rebutting of Presumption.
10. Invented Examples as Argument and as Ornament.

11. Direct and Indirect Refutation.
12. The Use of certain Ambiguous Words, with three examples.
13. The Statement of Objections.
14. The different kinds of Introduction, with examples.
15. The Peroration.
16. The Address to the Feelings, and to the Understanding.
17. Indirect Description.
18. Perspicuity in the Construction of Sentences.
19. Energy as effected by the use of Tropes.
20. The Suggestive Style.

5. ANCIENT ORATORY.

SENIOR YEAR.—SECOND TERM.

1. What was the function of the orator at Athens?
2. What were the divisions of ancient oratory?
3. What limitations in the modern use of the word oratory?
4. Whence are oratorical rules derived?
5. What circumstances gave to Athenian oratory its peculiar development?
6. What are the leading points of difference between that period and our time?
7. What is the connection between oratory and democracy?
8. Give an account of the first political orator at Athens.
9. The character, style, and influence of Georgias.
10. Who were the prominent sophists? What was their relation to Grecian culture?
11. By whom was "The lives of the ten orators" probably written?
12. What were the peculiarities of the style of Lysias?
13. State the peculiar features in the life, character and position of Socrates?
14. Plato's view of Rhetoric in the Georgias, and in the Phædrus.
15. His view of the essential opposition of the philosophical to the political life.
16. What were the characteristics of Demosthenes' style?
17. Who were the leaders of the Macedonian and the Anti-Macedonian party?
18. Compare Demosthenes and Cicero.
19. State what were the characteristics of the decline of eloquence.
20. Name the different periods of Roman eloquence after the Italian period.

6. COMPARATIVE LITERATURE.—FOURTH YEAR.—THIRD TERM.

[*Ten topics assigned to each student.*]

1. In what respect is all criticism comparative?
2. What is "disinterestedness" in criticism?
3. Give a definition of literature.
4. How does Hegel classify the different kinds of poetry?
5. What is meant by Aristotle's aphorism, "Poetry is truer than history?"
6. In what do present methods of literary criticism differ from past?
7. What is Sainte Beuve's idea of a classic writer?
8. Give a concise statement of Romanticism and Classicism in literature.
9. What gives a work a place in Universal literature?
10. Why is the Fable one of the earliest forms of literature?
11. State the characteristic features of La Fontaine, and the points of difference between his fables, those of Æsop, and those of India.
12. How far is poetry an "imitative" art, and what are the limitations to the term?
13. Illustrate, by epic, elegiac and iambic verse the necessity and æsthetic value of rhythmic expression.
14. What is peculiar to Hebrew poetry?
15. State the theories concerning the Homeric epopee.
16. In what does epic unity consist? lyric? dramatic?
17. Mention the great national epics, and the features which they have in common.
18. What is meant by epic "machinery," and how can the term be applied to Homer and Virgil?
19. Give De Quincey's view of an Achilleis.
20. How does the Nibelungenlied illustrate the formation and growth of the national epic?
21. State your idea of Tennyson's Idyls of the King as an epic.
22. Show some of the characteristic differences between the drama of Æschylus, Sophocles, Euripides and Shakespeare.
23. Give a brief account of the "Prometheus," "Antigone," and "Medea."
24. Mention the leading characteristics of the comedy of Aristophanes.
25. State and criticise Taine's estimate of Milton.
26. What was the origin and function of the Greek chorus?
27. When did History first take its place as a distinct form of literature in Greece?
28. What are Aristotle's reasons for assigning to the drama a higher place than to the epopee?
29 State the characteristic features of Roman literature.

30. What is the chief distinction between the French and English drama at the period of highest development, and what is the leading cause of that difference?

X. MILITARY SCIENCE.

TACTICS, FIELD FORTIFICATION, ETC.—LT. VAN NESS.

1. Give the commands and explain how a battalion in column of fours may be rapidly thrown to the front in line of battle.
2. By what commands and movements may a battalion in double column be deployed to the right or left into line of battle?
3. What are the functions of each of the three arms of the service: infantry, cavalry and artillery?
4. Explain the composition and duties of the advance guard of an army in the field.
5. State the object of outposts, and how they are disposed.
6. Draw a plan of a bastioned fort, and describe the mode of constructing such a work of earth.
7. Explain the manner of constructing bomb-proof shelters and powder magazines.
8. Describe the three kinds of cannon now in use, and the projectiles which pertain to each.
9. Describe the time, concussion, and percussion fuzes.
10. Describe the Bormann time-fuze.

III. TECHNICAL COURSES.

The studies of the first two years of each of the Technical Courses are to a large extent the same as those of the first two years in the course in science. Hence, the examination papers that follow relate to studies of the third and fourth years of the respective courses.

I. AGRICULTURE.

[*Besides the papers given below, all those on Botany and Economic entomology in the special department of Natural History are included in the course in Agriculture also.*]

I. AGRICULTURAL CHEMISTRY—PROFESSOR CALDWELL.

I. JUNIOR YEAR—FIRST TERM.

1. What is meant by the terms "specific gravity" and "specific heat?" How are the specific heat and specific gravity of a body determined?
2. Illustrate by examples and explain the absorptive power of solids for gases.

3. Describe and explain the phenomenon o. osmose.
4. What relations do heat and electricity bear to chemical change?
5. Name the elements that compose most of the known mass of the earth in the order of the abundance of their occurrence.
6. Five pounds of nitric acid and eight pounds of ammonia may be conveyed to the soil of an acre in the annual rainfall. How much would it cost to supply an equal quantity of nitrogen in the form of ammonic sulphate, containing 90 per cent. of pure salt, and costing six cents per pound?
7. What are the chemical changes that accompany the germination of seeds?
8. What changes in the condition of the surrounding atmosphere are produced by growing plants?
9. What are the relations between fermentation, putrefaction and life?
10. What are the proofs that soil is derived from the rocks?
11. Describe the main features of water-culture experimentation.
12. How would you proceed to investigate the function of an ash ingredient of a plant?
13. In what form must the sulphur required by the plant be supplied in its food?
14. Discuss the occurrence, necessity and function of sodium, with respect to vegetable growth.
15. Describe the principal steps in a quantitative gravimetrical analysis.

II. JUNIOR YEAR—SECOND TERM.

1. Why does a soil rich in humus absorb more oxygen than one poor in humus?
2. What interesting result is produced when a solution of an ammonium salt is passed through a portion of soil, and how can it be proved that the phenomenon is not a case of mere displacement of the solution already in the soil?
3. Explain the chemistry of the action of zoolites as absorbents of plant food.
4. How is it proved that zoolites are present in an arable soil?
5. Is or is not any part of the absorbent power of the soil attributable nearly to its porosity, and upon what experiments do you base your answer?
6. What oxide takes special part in the absorptive power of the soil for phosphoric acid?
7 Are nitrates absorbed by the soil? Give the reason for your answer.
8 If the soil of an acre one foot deep weighs about 3,000,000 pounds, and a fair dressing of guano, containing 10 per cent. of nitrogen, is 300 pounds; what bearing have these facts in illustration of the practical value of a soil analysis?

9. What are the chemical properties of humus?

10. What is the evidence that shows that plants do not get their carbon from the humus of the soil in which they grow?

11. What is the relation between the amount of combined nitrogen conveyed to the soil in the atmospheric precipitations, and the amount required by the crops?

12. How does the agricultural value of a lime yielded by dolomite compare with that yielded by limestone? Give the reason for your answer.

14. What part may lime play in a soil containing much nitrogen in the form of organic remains?

15. Explain the chemistry of the conversion of insoluble into soluble phosphate.

16. About what proportion of its manurial value does fodder lose in its conversion into manure by the animal?

2. VETERINARY MEDICINE AND SURGERY—PROFESSOR LAW.

I. VETERINARY ANATOMY AND PHYSIOLOGY.

1. Describe the shoulder joint in the horse stating particularly the various means by which the bones are retained in apposition.

2. What is the principal thoracic muscle engaged in quiet respiration? State its mode of action and whence it derives its nerves?

3. What muscles coöperate to open the glottis? What is the difference (as regards their origin) of the motor nerves of these muscles on the right side and the left?

4. State what you know of the changes in the air and blood effected in respiration:—of the quantity of air taken in at each inspiration in the horse:—of the amount of deterioration effected by each successive inspiration of the same air;—and the stage at which re-breathed air becomes uninspirable.

5. How would you treat asphyxia in the newborn and adult?

6. What would be the effect of closure of the nostrils in the horse and why?

7. Describe the position and extent of the frontal sinus in the horse and ox.

8. Describe the parotid gland:—its structure, its position, and the course of its duct;—and state the main uses of saliva.

9. Mention what you know of the functions of the liver and the uses of bile.

10. In which of the domestic animals are the intestines the longest and in which the most capacious? What relation does length of intestine bear to the nature of the food and the size of the stomach?

11. State the main differences, in composition and chemical reaction, of the urine of carnivora and herbivora, together with the causes.

12. What causes the sigmoid curve in the penis of the bull? State its pathogenic influence in cases of urinary calculi.

13. Describe the membranes of the fœtus in the later months of gestation, and state the uses of the water bags during pregnancy and parturition.

14. State the leading principles to be considered in seeking to improve animals by breeding.

15. Describe the mode of union of the pedal bone and the hoof wall in the horse.

II. VETERINARY MEDICINE AND SURGERY.

FIRST TERM.

1. What are the general symptoms and phenomena of fever?

2. What special features distinguish cancers from simple tumors?

3. How would you proceed to disinfect a wooden building, containing straw or hay, the building having been occupied by the victims of lung fever?

4. Enumerate the more serious contagious fevers of cattle?

5. In what respects do the malignant carbuncular afflictions differ from the specific contagious fevers? State the general causes and the characteristic lesions in the blood and tissues in the first.

6. State the symptoms and course of the intestinal fever of swine (hog-cholera).

7. Mention the climatic conditions necessary to the maintenance of Texan furr in cattle.

8. Enumerate the common gastric and intestinal parasites of the horse. State the portions of the alimentary canal in which they are respectively found and whether they infest other organs or what.

9. What parasites cause urinous bronchitis in horse, ass, ox, sheep and swine respectively? What are the symptoms of their presence, and the treatment demanded?

10. What different features and habits in the mange producing acari lead to the varying inveteracy of the existing disease?

11. What are the best general parasiticides for parasites living on the skin?

12. What causes tinea tousurans in animals? State the symptoms and treatment.

13. State the causes, symptons and treatment, of goitre in the domestic animals.

14. What conditions give rise to *roaring* in horses?

15. How would you distinguish laryngitis and pharyngitis in the horse?

16. State the distinctive symptoms of *nasal gleet, pus in the nasal sinuses, nasal discharge from diseased teeth, and collections of pus in the guttural pouches.*

III. SECOND TERM.

1. State the common causes of *facial paralysis* in the horse, with the symptoms and treatment.

2. State the symptoms of *amaurosis*, the usual lesions, what cases are curable and what incurable, and the treatment in the different cases.

3. State the symptoms and lesions of *cataract* and what treatment is desirable.

4. A horse has chronic fœtid discharge from the nose, falls off in condition, has occasional slight colicky pains, and drops portions of his food half chewed; what is probably amiss and how can it be remedied?

5. How would you distinguish *inguinal hernia, hydrocele, sarcocele?* What treatment would you advise in each?

6. State the common causes of acute and chronic tympany in oxen, and what can be done to relieve.

7. Give the causes and symptoms of gastric tympany in the horse, and state how it differs in gravity from that of oxen.

8. What functions are fulfilled by the liver in addition to the secretion of bile? What diseased conditions may be brought about by impairment or suspension of these functions?

9. What species of worms is most commonly found in the blood-vessels of the horse? What symptoms arise from their presence in the anterior mesenteric artery and its divisions? What can be done to relieve?

10. State the symptoms of ordinary and capillary bronchitis, and how they can be respectively distinguished from those of worms in the lower air passages, pneumonia and pleurisy? Furnish general principles for treatment.

11. How does the hepatized lung of ox and pig differ from that of the horse or dog?

12. State the general causes and results of periostitis in metacarpal and digital bones, also the treatment in the different stages.

13. Describe the peculiarities of gait characteristic of lameness in shoulder, elbow and foot respectively, and give an explanation founded on anatomical and physiological data.

14. Describe the various conditions causing *knee sprung*, or starting forward at the carpus.

15. Mention the various structural lesions and functional disorders which may cause lameness in the shoulder.

16. Enumerate the disorders which are especially dependent on damp undrained land.

3. APPLIED AGRICULTURE.—PROFESSOR ROBERTS.

I. SENIOR YEAR—FIRST TERM.

1. State how air, water, heat, and light influence the fertility of the soil and the growth of plants.

2. Explain how formed, classify, and give the leading characteristics of soils; also note their adaptation to the growth of grain and grasses.

3. State what climate and soil is best adapted to the growth of cereals.

4. What to clover and the various root crops.

5. How much change in altitude gives a change of one degree in temperature? In this connection give the reason for frost appearing in the lowlands before it does on the adjoining hillsides.

6. State the subjects to be taken into consideration in the selection of a farm placing them in the order of their relative importance.

7. Fields—how laid out.

8. Fences—manner of construction and material used.

9. Plans for construction, and materials for farm buildings.

10. Farm yards and water privileges.

11. Farm house surroundings.

12. Farm accounts—how kept.

13. What are the objects sought by general tillage? How may we best accomplish them?

14. State the benefits arising from the mechanical division of the soil, and explain how we may often accomplish the same result by utilizing the forces of nature.

15. Give in brief the method of the preparation of the soil, planting, harvesting, and marketing of cereals: also, kind, quality, and mode of application of fertilizers.

16. Give in brief the manner of manufacturing, preserving and applying farm yard manure.

17. Give those elements which are most liable to become exhausted from severe cropping.

18. Give the reasons for rotation of crops, and state the amount of Ammonia, Phosphoric acid and Potash that is removed from an acre by a single crop of wheat of twenty five bushels per acre, allowing the straw to weigh three hundred pounds.

II. SENIOR YEAR—SECOND TERM.

1. Give the history and characteristics of Short-horns.

2. Holsteins.

3. Ayrshires.

4. Jerseys.

5. Explain the laws of transmission or likeness.

6. Of variation.

7. State when a prepotent animal is valuable and when not.

8. Draw a circular diagram of the pedigree of the short-horn bull St. Valentine, tracing it through all its branches, and down to the first volume of the English herd-book, and give the per cent. of alloy blood, if any.

9. Give a synopsis of the history of the four leading breeds of swine.

10. State the leading characteristics of each breed and its adaptation to locality and circumstances.

11. Give the reasons why young animals will gain more pounds gross in proportion to the food consumed than old ones.

12. Give the history and comparative value with reference to nearness or remoteness from large cities and cheap lands, of the following breeds of sheep:

13. Spanish Merinos.

14. Southdowns, or Mutton Sheep.

15. Combing, or Long-wooled Sheep.

16. Give the summer and winter management of Sheep and Lambs.

17. Time of shearing, mode of handling, and marketing the wool.

III. SENIOR YEAR—THIRD TERM.

1. What are the injurious effects arising from surplus stagnant water in the soil?

2. Distinguish between moistness and wetness of soils, and illustrate by diagrams.

3. What are the effects produced on soil, climate, and plants by thorough drainage.

4. Explain the Elkington system by diagram and state when it can be advantageously applied.

5. Measure, lay out, and map for thorough drainage, the east field on the farm.

6. Give specifications and estimates for the same, locate silt basins, also give size and kind of tile.

7. Give the method of the preparation of the soil, planting, and cultivation of Indian corn. Explain by diagram and give reasons for the same.

8. Describe the mode of raising roots by both flat and ridge culture, and give their value as food for animals, as compared with English hay.

9. Give in brief the history of the thorough-bred horse.

10. Enumerate and describe the leading breeds of draught horses.

11. Sketch "Goldsmith Maid." Note and number on the margin the exterior points.

12. Compare each of these with the points in the draught horse, and state wherein the mechanical proportion and general conformation may, and should differ.

13. Give the most approved methods of educating and training a young horse.

14. Illustrate with a horse on the campus the manner of subduing those that are vicious and wild.

15. Give stable management for road and farm horses.

16. Give the common and scientific name of each of the various forage plants.

17. Give their comparative value as food for domestic animals.
18. State how and when they should be cut and cured.
19. Collect and name ten species of weeds and state the best methods of eradication.
20. Name the parts in the Reaper and Mower that are most liable to get out of repair.
21. Point out those parts where the greatest loss of power is sustained from concussion, and the remedies for the same.
22. Illustrate by diagram, the principles and attachments of a horse hay fork and conveyor.

4. HORTICULTURE—PROFESSOR PRENTISS.

1. Name the so-called small fruits.
2. Give the botanical name of each, and state the Natural Order to which it belongs.
3. Write out a brief treatise on the cultivation of the small fruit you regard as most valuable.
4. Propose a plan for a fruit garden of two acres which shall admit of the highest degree of economy in its thorough cultivation
5. Give a classification of the diseases of plants.
6. Give a description of those which are most injurious to fruits.
7. Mention the diseases of all our drupaceous fruits, and state the most approved remedies.
8. Give your opinion as to the relationship of forest growth to climate.
9. Define landscape gardening, and name the different styles and schools.
10. Characterize the different styles.

II. ARCHITECTURE—PROFESSOR BABCOCK.

1. EXAMINATION IN BUILDING MATERIALS AND CONSTRUCTION.

1. Name the stones commonly used in building, and classify them geologically.
2. What is lime?
   " " hydraulic lime?
   " " cement?
   " " Portland cement?
   " " plaster Paris?
   " " selenitic mortar?
3. Explain the proper method of making concrete, and give the formula for the ingredients.
4. Name the kinds of wood commonly used in building.
5. Name the different methods of dressing stone.
6. Name and sketch three kinds of facing work in stone walls.

7. Show by sketches the English bond, the Flemish bond, and the common bond.
8. Name the best methods of seasoning timber.
9. What is dry-rot? and how can it be prevented?
10. What metals are commonly used in building?
11. Name and sketch the common forms of arches.
12. Of what is glass made; and what are the ordinary kinds?
13. Define the following terms: Stylobate. Pediment. Battlement. Architrave. Skew-back. Pillar. Pilaster.
14. Name the parts of an entablature.
15. Sketch a king-post truss.
" " queen " "
" " hammer beam truss.
" " collar " "
" " Howe "
16. Name the essential parts of the construction and finish of a wooden stair-case.
17. What materials are used for the outer covering of roofs?
18. Why is sand mixed with the lime in making mortar?
19. What is a compound pier?
20. What metals are bases of the paints in common use?

2. EXAMINATION IN MECHANICS.

1. Define Mechanics; name its subdivisions; and state to which one of them our discussion has been limited.
2. What is a *structure?*
" " " *machine?*
3. What is *force?*
" " *equilibrium?*
4. Define stiffness.
" strength.
" toughness.
5. Define Resolution of forces, and composition of forces, and illustrate by the parallelogram and polygon.
6. What is the *moment* of a body?
7. Sketch a queen-post truss, with braces; name each piece; and state which are ties, and which are struts.
8. State the methods of analyzing a king-post truss graphically.
9. What is the deflection of an oak beam, 20 ft. long, 8x12, carrying a load of 1,000 lbs. at the middle point?
10. Explain the method of finding the centre of gravity of a quadrilateral.
11. Explain the method, and give the formula, for finding the centre of gravity of a figure which is the difference of two figures.
12. What are the four ordinary modes of rupture in an arch?
13. Explain the method of determining the horizontal thrust at the crown of an arch.
14. Explain the method of determining the direction and value of the thrust at the foot of a rafter.

15. How is the position of the neutral axis in a beam determined?
16. What is the ratio of a load at the middle point of a beam to an evenly distributed load which will produce the same deflection?
17. Explain the method of determining the line of resistance in a pier.
18. Explain the method of determining the line of resistance in an arch.
19. To what forces is a loaded beam subjected, and in what part of the beam does each of them act?
20. Explain the principle of the lever, and the method of determining the common centre of gravity of two weights.

3. ARCHITECTURE.

WINTER AND SPRING TERMS.

1. Make a sketch showing the general arrangements of a Christian Basilica, and name the various parts of such a building when fully developed.
2. What is the characteristic feature of the Basilican style? of the Byzantine? of the Lombard? of the Italian Romanesque?
3. Define the following terms: Triforium. Narthex. Campanile. Pendentive. Baptistery. Baldacchino.
4. Name the subdivisions of Romanesque Architecture.
5. Name the two best examples of Byzantine Architecture, and give their dates.
6. Explain the general treatment of the bell of a capital in the Romanesque styles, and sketch the typical forms.
7. What methods of decorating the interior surfaces were in use during the Byzantine period?
8. Name the style to which each of the following buildings belong: The Cathedral at Worms. St. Nicholas, Bari. Santa Fosca, Torcello. Cathedral at Pisa. San Miniato, Florence. San Ambrogio, Milan. Cathedral at Spires. Notre Dame, Clermont. Cathedral at Rheims. Cathedral at Canterbury. St. George, Bocherville. Tower of Earl's Barton.
9. What are the subdivisions of Gothic Architecture?
10. Sketch a plan of a fully developed Rib-Vault, and name the parts.
11. Sketch and name the typical forms of the vaulting used in the later English Gothic buildings.
12. Sketch the sections of the different kinds of Bowtells.
13. Sketch a plan of a Romanesque compound pier, and the arch supported by it.
14. Explain, and show by sketches, the difference between plate-tracery and bar-tracery.
15. Explain and sketch the methods of effecting the transition from the square tower to the octagon spire.

16. For what purpose was the pointed arch first systematically used?

17. Show by a sketch the construction of a sexpartite vault.

18. Give the dates of the three periods of English Gothic Architecture.

19. Why was the flying buttress introduced?

20. Which is the best Gothic Cathedral in France? Which is the best Gothic Cathedral in England? Which is the best Gothic Cathedral in Germany?

III. CHEMISTRY AND PHYSICS.

CHEMISTRY—PROFESSOR CALDWELL.

1. QUALITATIVE ANALYSIS.

SECOND YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used, to prove, both the presence of these elements, and the absence of all others: if possible, write the equations representing the final reactions by which you prove the presence of each of the elements mentioned.

1. As_2O_3, $SnCl_2$, $Pb(C_2H_3O_2)_2$, $Bi(NO_3)_3$, NH_4Cl, KCy.
2. K_4FeCy_6, HNa_2PO_4, $(NH_4)_2C_2O_4$, $Na_2B_4O_7$.
3. $Pb(C_2H_3O_2)_2$, $AgNO_3$, $HgCl_2$, Na_2SO_3, $(NH_4)_2C_2O_4$, Na_2SO_4.
4. $FeSO_4$, FeS, Cr_2O_3, Al_2O_3, $CuSO_4$, Hg_2Cl_2, $SnCl_2$.

2. QUANTITATIVE ANALYSIS.

THIRD YEAR, FIRST TERM.

Describe, in detail, the manner in which you would conduct the quantitative analysis of a substance containing the elements given below; stating the methods to be employed, the precautions to be observed, and the reagents to be used.

1. Cupric sulphate, (the copper being precipitated as hydride).
2. Brass.
3. Rochelle salt (estimation of potassium and sodium).
4. Ferric phosphate.
5. Type metal.

3. CHEMICAL PHILOSOPHY.

THIRD YEAR, FIRST TERM.

1. What weight of Hydrogen is required to raise a weight of

5000 gms., and what would be its volume at —17° C. and 255 mm. barometric pressure.

2. How much iron would be required to produce that amount of Hydrogen. $Fe + H_2SO_4 + aq = FeSO_4 + aq + H_2$.

3. Define molecule. What is a simple, and what a compound molecule? Give examples.

4. What is meant by atomic and what by molecular weight? Show how the laws of definite and multiple proportion are in accordance with the atomic theory.

5. How may we distinguish between a mixture and a chemical compound?

6. What relation does the molecular weight bear to the sp. gr. of the molecule in the gaseous state?

7. What is the weight in criths of one liter of HCl?

8. The specific heat of a metal is .03244. It forms a compound with Chlorine containing 34.8 per cent. of Cl. What is the atomic weight of the metal and what is its quantivalence?

9. Molecular weight of potassic chlorate is 122.6, and 2.95 grs. contain 1.155 grs. of oxygen. Required the total atomic weight of oxygen, and the number of oxygen atoms in the molecule.

10. Analysis of a substance gives the following results:—C 26.57; H, 2.74; O, 71.11. Required the simplest formula, and the percentage composition calculated from that formula.

11. Explain variations in equivalence. What is the law that governs this variable power? Give examples.

12. What are condensed types? Give examples.

13. What are fat acids? In forming fat acids from alcohols, how are the positive radicals changed to negative ones?

14. Give the general formula for mixed ethers.

15. What is the rule for the termination of the positive radical, in the nomenclature of ternary compounds of the water type?

16. In case of variation of quantivalence in the negative radical, what are the terminations and prefixes used in the nomenclature of ternary compounds of the water type?

17. To what class does the compound represented by each of the following symbols belong:

CH_3	C_2H_5	C_2H_4	C_2O_2	K
H N	C_2H_5 N	H_2 N_2	H_2 N_2	Cl N
H	H	H_2	H_2	H

CHEMICAL TECHNOLOGY—PROF. BRENEMAN.

THIRD YEAR, SECOND TERM.

1. Show the general relations of the direct products of chemical industry to the indirect and waste products.

2. Describe the manufacture of the form of sulphuric acid known as chamber acid and give the characteristic properties of this product.

3. Explain the internal economy of the lead chamber with reference to the chemistry of the process and the probable localization of the different reactions.

4. Describe the Glover's tower, Sprengel jet and Faure and Kessler still used in the manufacture of sulphuric acid.

5. Give an account of the recovery of sulphur from the tank waste of the soda works and compare the different methods in use.

6. Describe the lixciviation of black ash and compare the views of Scheurer, Kestner and Kolb as to the chemistry of this process with those of Dumas.

7. Describe the rotary soda furnace and compare it with the ordinary black ash furnace.

8. Explain the ammonia soda process; give an account of its origin and discuss its commercial importance.

9. Describe in detail the manufacture of bleaching power, giving the conditions to be observed in preparation and packing.

10. Describe the Stassfurt salt deposits and show their relations to the chemical industries.

11. Explain the nature of "rosin," "olein," "mottled" and "silicated" soaps.

12. Describe the by-products of the fat acid industry and their utilization.

13. Give an account of the gas purifier and compare the different methods of purification.

14. Trace the changes in the chemical composition of coal gas from the retort to the gasometer.

IV. CIVIL ENGINEERING—PROFESSOR FUERTES.

[*Each student in this Department on entering the examination room, draws by lot a numbered card containing the subjects he is expected to discuss.*]

I. MECHANICS.

[*Papers which give only the general heading of a subject indicate that the student is expected to write, as fully as he may be able, upon the theory of the subject and also to develop and discuss the mathematical analysis.*]

I.

12. Demonstrate several methods for finding the resultant of a system of forces in space.

16. Centres of gravity.

20. Develop and discuss the formula for dynamical stability.

II.

1. (*a*) Couples. (*b*) Centrifugal force. (*c*) Centre of percussion.

III.

1. Strength of shearing: (*a*) Working load. (*b*) Rupture by shearing.

6. Action of shearing force in the plane of rupture. Value of the shearing force.

11. (*a*) Modulus of proof strength for shearing. (*b*) Power that may develop the shearing stress to the limit of proof strength for elliptical, cylindrical and tubular girders.

IV.

1. Elongation of a prismatic body in terms of the elongating force: Modulus of elasticity. The force corresponding to the elongation.

(*a*) UNIFORMLY LOADED GIRDERS.

I. *Free at one end.*—Find the tangential angle, and the ordinate giving the deflection for any point of the curve. The deflection for the middle point of the girder. The work done in producing the deflection. The deflection for a terminal load in addition to the uniform load.

II. *Girder supported at both ends.*—Find the total deflection. Prove that for a uniform load, the depression is $\frac{5}{8}$ of that produced by a local central load.

$$\text{Data}: Q = ql \qquad \delta_1 = \frac{Ps^2}{n^2 WE}$$

(*b*) HOLLOW AND WEBBED GIRDERS.

Find the measure of the moment of flexure of the following: A tubular girder. A single webbed girder with double flanges. A crucial girder. A T girder. Prove that for the same quantity of material the high webbed and flanged girder gives the greatest moment of flexure. In the case of a beam twice as deep as it is broad, find the moment of flexure when the direction of the force is parallel to the depth of the beam, and compare it with that when the deflecting force is normal to it.

(*c*) MOMENTS OF PROOF LOAD.

Prove that the moment of proof load for parallelopipedical beams increases with the width and the square of the height, while the proof load varies inversely as the length.

Also that in bodies of equal weights, masses or cross-sections, the proof loads are proportions to their heights. And that when a square beam is placed with its diagonal in the plane of the deflecting force, its proof load is 0.707 of what it would be if it were laid on its side.

$$\text{Data}: Pl = \frac{WT}{E} \qquad W = \frac{bh^2}{12} = \frac{\pi a^2 b}{4} = \frac{\pi r^4}{4} \ \&c.$$

(d) GIRDER FIXED AT ONE END AND LOADED BY TWO PARALLEL FORCES.

Find the moments of flexure. Discuss the maxima and minima values of these moments for all positive and negative values of the pressures, and locate the points of inflection of the elastic curve.

$$\text{Data}: r = \frac{WE}{m} = \frac{WE}{Px}$$

No. 6.

Find the most general equation of the elastic curve, or

$$y = \frac{Pl^3}{3WE}$$

$$\text{Data}: r = \frac{WE}{Pa} \qquad r = \frac{(dx^2+dy^2)^{\frac{3}{2}}}{d^2y dx} = \frac{1}{\frac{d^2y}{dx^2}} \text{ nearly.}$$

Take the origin at the loaded end of a beam, fixed at one and free at the other. If you prefer Weisbach's method, take

$$WE = Pxr \qquad ds = \sqrt{1+(\tan a)^2}dx \qquad r = -\frac{ds^3}{dx^2.d(\tan a)}$$

$$\tan a = \frac{P(b^2 - x^2)}{2WE}$$

(e) MOMENT OF FLEXURE.

Prove that in rectangular beams, the neutral axis passes, *theoretically*, through the centre of gravity of the cross-section; and find the bending moment for a parallelopipedical beam, imbedded at one end and loaded at the other. Find also the radius of curvature of the neutral surface.

(f) FRICTION.

Find the force required to draw a body up or down upon an inclined plane under any conditions of the direction of the force and of the motion.

(g) FRICTION.

Find the moment of friction of a cylinder resting on its right section; also when it rests on a cylindrical ring, and when on a conical pivot.

2. LAND SURVEYING—MR. CRANDALL.

1. Assume the following field notes and magnetic bearings:

* * * * * * * *

The magnetic variation is 7 degrees, 15 minutes West. Reduce the data to the true meridian, calculate the area by latitudes and departures, prepare the plotting sheet, and from the N. W. corner of the field draw two lines that will divide the plot into three equal areas.

3. HIGHER GEODESY—MR. CRANDALL.

1. Give a brief outline of the operations required in a trigonometrical survey.

4. Find the angle and side equations, and the probable error of the side *ce* in the following sketch:

* * * * * * * *

The angles of each triangle were observed separately, with the exception of *dea* and *acb*, which were not observed at all: or the side *ae* was observed in only one direction. The base line is *ad*.

5. Required: The data for locating the boundary line, (which is the 42d parallel of latitude) between New York and Pennsylvania.

6. Describe the method of plotting a chart of small extent by means of the Polyconic Projection tables.

7. Find the length of a degree of latitude in the latitude of Cornell.

4. RAILROAD SURVEYING—MR. CRANDALL.

1. Describe the adjustments of the Dumpy Level.

3. In order to locate a railroad two trial lines were run, giving the following field notes (see sketch):

* * * * * * * *

Find the equivalent straight and level length of each, and the more economical line for a given amount of traffic.

5. Required: the frog distance, middle and side ordinates of a turnout on the outside of a 5° curve for a No. 7 frog: length of switch rail twenty feet.

5. BRIDGE CONSTRUCTION—MR. CRANDALL.

1. Define the term factor of safety and give its usual values for iron railroad bridges.

2. Discuss the Howe truss.

4. In a simple truss (as per sketch) subjected to a uniform rolling load, and taking into account the weight of the truss itself, find: (*a*) the general equation for the horizontal strains under the constant load for any point in either chord. (*b*) The horizontal strains for the same points when the moving load covers only a portion of the truss. (*c*) The greatest horizontal strain. (*d*) Discuss the results.

7. In a triple truss (as per sketch) please find: (*a*) the horizon-

tal strains at panel points of upper and lower chords of trusses No. 1, No. 2, and No. 3. (*b*) The compression in triple truss at points of No. 1, No. 2, and No. 3. (*c*) The tensions at panel points of the simple trusses.

18. State the conditions of a post and tie, under which the inclination for a minimum of material may be obtained, discuss the results of the analysis and solve any example.

6 BAROMETRICAL LEVELING—PROFESSOR FUERTES.

After making a double and simultaneous set of observations, the following data were obtained, after correcting for errors of the instruments:

Barometer columns at lower station	= 29'.439
" " " upper "	= 29'.200
Attached thermometer at " "	= 72°.08
" " " lower "	= 75°.91
Detached " " " "	= 75°.72
" " " upper "	= 72.33
Latitude	= 16°55'

Cistern on field, 6 feet above cistern at standard station. Elevation of sea level, 700 feet below cistern at standard station.

Find the elevation of the upper station above the sea.

7. ASTRONOMY.—PROFESSOR FUERTES.

1. Describe the sextant, the principle of its construction and its adjustments, including the adjustment for eccentricity.

13. Assume the following data:

Ithaca, N. Y., Dec. 7th, 1874.

Upper and lower limbs of the Sun, measured, in latitude, say, $42^\circ\ 27^m\ 30^s$ N, and longitude $1^m\ 40^s$ E of Washington. The mean time of observing the Sun's centre was $9^h\ 53^m\ 51^s\ 725$; and the double altitude corresponding to this time was $36^\circ\ 50^m$. The index error and all other sextant errors were $+2'\ 26''\ 25$. The chronometer keeps Albany mean time, and on the previous noon had been found $35^s\ 79$ slow. Find the rate of the chronometer, remembering that Albany is $11^m\ 32^s\ 87$ E of Ithaca.

14. Using as much as may be necessary from the above, find the latitude of Cornell, with the following additional data, taken on Dec. 5th, 1874.

Mean of the double altitudes of the Sun's centre, -	$43^\circ\ 27^m\ 30^s$
" " a. m. times, - - - - -	$10^\circ\ 29^m\ 9^s\ 09$
Index and other sextant errors, - - - - -	$+2^m\ 12^s\ 5$

8. HYDRAULICS.—PROFESSOR FUERTES.

7. Discuss the theory of efflux in accordance with Prof. Eddy's method.

8. Find the theoretical discharge through circular orifices in a thin plate.

19. Find the expressions for the head, diameter, velocity and delivery of long pipes, for all velocities, taking into account all resistances. Discuss the formulæ, the manner of applying them, and the precautions to be observed in designing a system of distributing pipes.

26. Describe the conditions of efflux when an abrupt contraction takes place in a conduit by the interposition of a diaphragm, find the loss of head and the law of the coefficient of resistance, and also the coefficients of resistance and contraction when the diaphragm is removed.

34. Sketch and describe a single and a double canal lock. Find the time required for filling and emptying both kinds of locks, and establish formulæ for the water consumption under circumstances of traffic that you may assume at your will.

22. In order to judge of the relative merit of several water meters, suppose that they are made to deliver water (under the same conditions of pressure and connections) through a short horizontal mouth-piece under 12 ft. of head. One of these meters is observed to deliver a turbid stream having a horizontal range of 9.8 ft., after falling through a height of 1.67 ft.; but at a vertical distance of 3.27 ft. below the outlet, the horizontal range is 4.9c ft. Required the coefficient of velocity due to the resistances offered by this meter.

37. Find the height of swell produced by a weir when it is and when it is not submerged or drowned.

38. Find the amplitude of backwater caused by a weir.

6. Given the fall, peripheral velocity and angle from the vertical at which an over-shot wheel takes water, find the radius of the wheel, the number of revolutions, width and number of buckets.

11. Find the effect of the impact, of the weight of the water, and of the centrifugal force, in an over-shot wheel.

STEREOTOMY.—PROFESSOR FUERTES.

1. The dimensions of an oblique segmental arch bridge are as follows:

* * * * * * *

Please calculate, by Buck's system, (*a*) the oblique span. (*b*) Obliquity. (*c*) Angle of the soffit. (*d*) Length of heading spiral. (*e*) Number of voussoirs, [about 1½ feet thick] (*d*) Thickness of voussoirs. (*e*) Length of impost. (*f*) Actual divergence of courses. (*g*) Adjusted angle of soffit and axial length. (*h*) Angles of extrados and of twist. (*i*) Adjusted eccentricity. (*j*) Size of parallel rule, distance between winding sticks at intrados and extrados, and breadth of broad end of winding stick. (*k*) Triangular template for skew backs. (*l*) Describe the manner of constructing and using the templates for the six faces of the arch stones.

2. Explain the different systems of construction in oblique bridges, and compare their relative advantages and disadvantages. Sketch the projections for the so called helicoidal, logarithmic and corne de vache arches.

10. CIVIL ENGINEERING.—PROFESSOR FUERTES.

Describe the modes of rupture of several kinds of arches. Find the pressure per units of surface upon the joints of an arch.

5. Establish Van Buren's general equation for calculating the stability of retaining walls. Discuss its applications in a general way.

7. Manipulations of mortars and concrete. Theory of mortars.

9. Classification of tunnels, their dimensions, form, etc. Running the shafts.

11. Driving the headings. Poling boards.

13. Staking out the longitudinal profile underground. Laying out the transverse section of a tunnel.

5. MECHANIC ARTS.

I. LINEAR DRAWING.—PROFESSOR MORRIS.

SECOND YEAR.—FIRST TERM.

1. To divide the line A B into any number of equal parts. Let the number be 7, 9, 13.
2. To construct a square on a given diagonal AB.
3. To inscribe a square in any triangle ABC; in a given trapezium ABCD.
4. On a given line AB construct a regular pentagon; a regular heptagon.
5. To inscribe three equal circles in a given circle.
6. The diameters being given, draw an ellipse by intersecting arcs.
7. To construct a parabola, the base AB and abscissa CD being given.
8. To draw a hyperbola, having given the diameter AB, the abscissa and double ordinate CE.
9. To describe the cycloid, epicycloid, hypocycloid.
10. To draw a circle which shall touch both lines of an angle and shall pass through a given point P.

II. ORTHOGRAPHIC PROJECTION.—PROFESSOR MORRIS.

SECOND YEAR.—SECOND TERM.

1. Give the plan and elevation of a line 2 inches long when it is inclined at 70 degrees to the horizontal and 45 degrees to the vertical plane.

2. Give plan and elevation of a square plane, 3 inches side when one of its diagonals is at 45 degrees to the horizontal and 60 degrees to the vertical plane, the other diagonal being parallel to the horizontal plane.

3. Give plan and elevation of a cube, 2 inches side, when resting on one of its solid angles, one diagonal of the base being at 50 degrees to the horizontal and the other 90 degrees to the vertical plane.

4. Draw the plan and elevation of a cylinder 5 inches long and 2 inches in diameter, when the axis is inclined at 60 degrees to the horizontal and 45 degrees to the vertical plane.

5. A pipe of sheet iron, 2 inches diameter, is to be joined so as to turn an angle of 120 degrees. Show on an elevation the inclination of the line of section, and show on a development the line in which the metal must be cut to form the required parts.

6. A cylinder 2½ inches in diameter and 6 inches long, is penetrated by another 1½ inches in diameter and 5 inches long, their axes being at right angles to each other and intersecting at their centres. Show the mode of obtaining the curves of penetration and the development of the larger cylinder.

III. MECHANISM (WILLIS')—PROFESSOR MORRIS.

THIRD YEAR.—SECOND TERM.

1. Draw diagrams and explain the method of finding the velocity ratio in link-work. Give corollaries.

2. Bevel gearing.—The position of the axes being given and also the ratio of the angular velocities, describe the frustra of the cones; also find the angles at the vertices.

3. Teeth of wheels.—To find the smallest number of teeth or pins that can be employed when the pins have no sensible diameter.

4. Describe the odontograph and the method of using it.

5. To describe the teeth of wheels when their axes are not parallel. Example, bevel wheels.

6. In the communication of motion by sliding contact, directional relation changing, how may a varying velocity ratio be obtained?

7. Communication of motion by link-work. Problem: To determine the motion of a slide when the path of the end of the link travels in a line that does not meet the axis; what is the effect of changing the length of the link or connecting rod?

8. Trains of elementary combinations. Problem: Given the velocity ratio of the extreme axes or pieces of a train, to determine the number of intermediate axes and the proportions of the wheels or number of their teeth.

9. How may parallel motions be obtained?

10. Determinate changes—speed pulleys. Problem: Let there

be a set of six speed-pulleys, in each group of which the diameters of the extremes are thirteen inches and four inches, to find the intermediate diameters.

IV. STEAM-ENGINE.—PROFESSOR MORRIS.

THIRD YEAR.—THIRD TERM.

1. Describe the principal parts and appendages of boilers and furnaces.
2. State the difference between a high and a low pressure steam-engine.
3. Describe the principal parts and appendages of a high pressure steam-engine.
4. The same of a low pressure steam-engine.
5. State what you can of testing of boilers, explosions of boilers, incrustation, and care of boilers.
6. How are steam-engines classed?
7. What do you understand by a horse power?
8. How do you ascertain the nominal horse power of high pressure engines?
9. What effect is produced upon the crank pin of a locomotive by changing the length of the main rod, when the cross-head is at the centre of its travel?
10. Where is the crank pin when the piston is at the centre of its stroke, the main rod being four times the length of the stroke?
11. Describe the link-motion.
12. What do you understand by the terms "lead," "lap?"

V. MATERIALS EMPLOYED IN THE CONSTRUCTION.—PROFESSOR MORRIS.

FOURTH YEAR.—FIRST TERM.

1. Divisions of the subjects.
2. Conversion of ore into cast iron.
3. Manufacture of wrought iron.
4. Steel and its production.
5. Characteristics of cast iron, wrought iron and steel.
6. Describe tempering, annealing, case hardening.
7. Zinc, tin, lead, copper and their most useful alloys.
8. Other materials besides the metals used in construction.
9. Care and preservation of materials.

VI. DESIGNING OF MACHINERY.—PROFESSOR MORRIS.

FOURTH YEAR.—FIRST TERM.

Select from the following subjects; give complete and detail drawings, with specifications and probable cost.

1. Lathe. — Screw feed. Slide rest, back-geared; swing, 16 inch: bed, 9 ft.
2. Planing Machine.—To plane 22 inches wide, 20 inches high, cross and angular feed.
3. Crank planer with adjustable stroke from 16 inches down; planing 15 inches wide, 13 inches high.
4. Back-geared drill with self-feeding attachment. Traverse of table, 26 inches; of spindle, 12 inches; distance between table and spindle 34 inches; distance between base and spindle 44 inches.
5. Ten H. P. portable engine best suited to agricultural work.

VI. NATURAL HISTORY.

I. BOTANY.

I. SYSTEMATIC AND APPLIED BOTANY.—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—FIRST TERM.

1. Name the five principal groups into which plants are arranged in the natural system of classification.
2. State briefly the distinguishing characteristic of each of these groups.
3. What are plant characters?
4. From what parts of plants are characters of the highest importance derived?
5. Define species, genus, and order.
6. Name ten natural orders which can be easily distinguished by brief characters and state what these characters are.
7. Give a schedule of some species of Rosaceæ proper.
8. On what principle and by whom was the present arrangement of natural orders first adopted?
9. Why is it impossible to express the affinities of the natural orders in a linear arrangement?
10. Mention such indigenous Saxifragaceæ as you know to abound in the flora of Ithaca.
11. Name the cultivated Saxifragaceæ.
12. Name the six largest natural orders in regard to the number of species.
13. Give an account of the distribution of the species of the orders Magnoliaceæ, Leguminosæ, Compositæ and Gramineæ.
14. What are the six most important orders as furnishing food plants in temperate regions?
15. What six orders furnish the most important timber plants?
16. Name the orders which furnish the most extensively used medicines.
17. Name the four plants which furnish very extensively used beverages in different parts of the world, state the order to which each belongs, and give some account of its natural history.

18. The same of the four important sugar-producing plants.

19. Enumerate the products of Euphorbiaceæ, Urticaceæ, Solonaceæ, Chenopodiaceæ, Cruciferæ and Coniferæ, giving as far as possible the scientific names of the most important plants.

20. What orders form the natural group called Amentaceæ?

21. Characterize the sub-orders of Rosaceæ, Leguminosæ, and Compositæ.

22. How do Cyperaceæ differ from Gramineæ?

23. Into what groups can Gramineæ be conveniently arranged for purposes of study?

24. State what the following vegetable products are, and name the plants which produce them: camphor, ginger, alkanest, elaterium, aloes, gum arabic, manna, caoutchouc, gum lac, cinnamon, cloves, nutmeg, turpentine, opium, logwood, rattan, boxwood, asafœtida, croton oil, fustic, jute, saffron, tonka bean, jujube, vanilla.

25. Give some statistics of species, genera, and orders, and of indigenous and introduced plants.

II. VEGETABLE PHYSIOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Describe the vegetable cell and treat of its structure, different forms and physical properties.

2. Give a classification of the different contents of cells and name those of each class.

3. Define and describe the different kinds of plant tissue.

4. Name the fundamental plant organs.

5. What are homologous organs?

6. What is absorption? Give an account of the result of the latest researches concerning this function of plants.

7. What is transpiration? Show how the existence of this function may be demonstrated and the amount of transpiration measured.

8. Treat of plant respiration.

9. Give some account of circulation in plants, and of crude and elaborated sap.

10. Describe the process of assimilation, and name the conditions under which it takes place.

11. Give a classified table of the products of assimilation.

12. Write out an account of starch, describing its formation, structure, variation, and use in the economy of the plant.

13. Name the four elements of the organic constituents of plants, and explain their source in nature.

14. Treat of plant food.

15. How do fertile differ from poor soils in relation to plant growth?

16. Give diagrams of cross sections of exogenous, endogenous and cryptogamous stems, the first in full detail of structure.

17. Describe the medullary system of the exogenous stem in reference to the grain of cabinet and finishing woods.
18. What are the organs of fructification in the phænogamia?
19. Show that a flower is homologous with a branch.
20. Describe the process of fertilization in the phænogams.
21. What is the present state of knowledge in regard to the sexuality of cryptogams?
22. Describe the process of fertilization in Filices.
23. How do seeds differ from spores?
24. Describe briefly the methods instituted by nature for the distribution of the species of plants.

III. FUNGOLOGY—PROFESSOR PRENTISS.

SECOND OR THIRD YEAR—SECOND TERM.

1. Draw a diagram of Æcidium Claytoniatum, and explain its structure.
2. State the specific differences of Æ. Claytoniatum and Æ. berberidis.
3. Explain the structure and supposed office of spermogonia.
4. What is meant by di-morphism?
5. Give an illustration from the false species Uredo rosæ.
6. What effect have parasitic fungi on the plant which nourishes them?
7. What is meant by alternate generation?
8. Illustrate this by a description of the change of forms in Uromyces appendiculatus.
9. Explain the structure of the conidia of Cystopus candidus.
10. Also the zoöspores of the same plant.
11. How is the parasitic fungus of any given crop transmitted to the succeeding crop?
12. Give the result of Doctor de Bary's experiment with the zoöspores of C. candidus.
13. Under what name is the immature wheat rust known?
14. What advantage to parasitic fungi is the production of different forms of fruit?
15. What remedies are available for rust in wheat?
16. Give a description of corn smut.
17. Also of the disease known as bunt.
18. Give some account of the potato rot fungus.
19. Also of the mildew of the grape vine.
20. What remedy is applicable to the latter disease?
21. What is the vinegar plant?
22. How do fungi induce fermentation?
23. What is known of the fungus which causes the disease called yellows?
24. Describe the fungus which causes the black-knot of plum and cherry.

25. How do fungi produce the decay in timber called dry-rot?
26. How may the attack of this fungus be prevented?
27. Draw a vertical section of Agaricus campestris, and name the parts.
28. How are edible distinguished from poisonous fungi?
29. State the characteristics of the six families of fungi.
30. Give a brief general description of fungi, as to their size, form and color.
31. Compare fungi with phænogamia as to their nutrition.
32. What are the uses of fungi?
33. Mention the diseases caused by fungi, in which prevention or remedy is practicable.
34. Also those in which no available remedy is known.
35. Mention the species of fungi which produce secondary forms of fruit on which false species have been founded.

2. ZOOLOGY.

I. ECONOMIC ENTOMOLOGY—INSTRUCTOR COMSTOCK.

1. Describe the articulate plan of structure.
2. Characterize the class *Insecta.*
3. Give tabular arrangement of the orders and suborders of the class *Insecta.*
4. Characterize the order *Hexapoda.*
5. Characterize the suborder *Lepidoptera.*
6. Explain the terms, larva, pupa, chrysalis, imago, incomplete metamorphoses and complete metamorphoses.
7. Give tabular arrangement of the typical mouth-parts of a true insect (*Hexapoda*).
8. What hymenopterous insects are social, and how do they differ from closely allied solitary forms?
9. Name two families of the *Hymenoptera* that are parasitic. Describe briefly their habits.
10. Characterize and give the habits of the *Sphingidae*; also *Aegeriadae.*
11. Describe the habits of the coddling-moth. Name remedies.
12. Describe the metamorphoses of the mosquitoes.
13. Describe the habits of the ground-beetles (*carabidae*), May-beetles (*Lachinosterna*), *Saperda Bivittata*, plant-lice, the snowy tree-cricket, ant-lion, aphis-lion and caddis-worms.

II. COMPARATIVE ANATOMY—PROFESSOR WILDER.

[*This is a special course for the students in the Natural History course and for others who choose to take it. It extends through the second and third terms. The subjects vary from year to year, the purpose being to give a complete account of a few forms or groups of animals, with discussion of their relative and bibliographical references*].

1. Enumerate the fishes of Cayuga lake.
2. Contrast the external and internal structure of the lamprey (*Petromyzon*), and the eel (*Anguilla*.)
3. Describe the development of *Petromyzon*.
4. Give diagrams (as transverse and longitudinal views) of the respiratory apparatus of *Amphioxus*, *Myxime*, *Bellostoma* and *Petromyzon*.
5. Give the external and internal characters of *Amia*, and name the teleostean genera to which it has some resemblance.
6. Compare the gar-pike (*Lepidostens*) with the sturgeon (*Accipenser*.)
7. Describe the brain of *Menobranchus*, and compare it with the brains of other Batrachians.

3. GEOLOGY.

I. ECONOMIC GEOLOGY—PROFESSOR COMSTOCK.

[*Select two questions from each set, except as noted.*]

1. Give series, class, division, family and sub-family of *syenite*, *syenitic granite*, *felstone*, *basalt*, *rhyolite*, *elvanite*, *quartz-porphyry*, *quartzite*, *dolomite*, *diorite* and *flint*.
2. Uses of term *trappean*. Differences of *granitic*, *trappean* and *volcanic* rocks.
3. Name and describe two aqueous, two igneous, and two metamorphic rocks.
4. Concise account of modes of origin of igneous, aqueous and metamorphic rocks.

5. Draw a single section illustrating *conformability*, *unconformability*, *three kinds of ridges* and *six forms of valleys*.
6. Illustrate five kinds of faults. Define "throw" of fault.
7. Illustrate by sections two advantages and two disadvantages in coal mining due to the occurrence of faults.
8. Give the so-called "rules of V."

9. Name the *native* metals in order of abundance and give the modes of occurrence of each in the pure state.
10. Geographical and geological distribution of gold.
11. Geological range of silver and its ores.
12. Give one prominent locality, with geological position, of each of the ores *cryolite*, *magnetite*, *hæmatite*, *galena*.
13. Occurrence of ores of *zinc*, *tin* and *lead*.

14. Occurrence of *copper* and its ores. Sources of mercury. *Chromic iron* in the United States.
15. Geological range of *peat*, *lignite*, *anthracite* and *bituminous coal*.
16. Name and define the principal coal fields of the world, stating character of product from each.

17. Prominent features of *cannel, free burning* and *caking* coal. Give locations of United States coal basins *not* of Carboniferous age.

18. Mode of occurrence and geological relations of *petroleum.*

19. Outline principal United States coal basins of Carboniferous age.

20. Causes of failure to obtain oil from wells sunk into the oil-bearing formation.

21. Most productive region in United States for gas wells. Source of the gas.

[*Here follow a number of sets relating to dyes, pigments, fictile materials, refractory substances, medicines, mineral waters, etc., after which are placed those given below.*]

[*Students of the courses in* SCIENCE *and* NATURAL HISTORY *will select two from this set.*]

46. Why should wells in drift deposits be avoided? Give structures suitable for artesian wells.

47. State clearly the general character of the products of economic importance which appertain to any one geological age.

48. Review briefly the economic products of any State of the Union.

[*Students of the* ENGINEERING COURSE *select two from this set.*]

49. Difference between *lake-formed* and *river-formed* sand-bars.

50. Explain use of *jetties* at river-mouths and elsewhere.

51. Compare *granites, felstones* and *greenstones* as road material. What should be avoided in choice of road gravels?

52. Quarrying in stratified and unstratified rocks, how differing? Placer mining, when practicable?

[*Two from this set to be chosen by students of the* COURSE IN ARCHITECTURE.]

53. Give geological age of the several rocks used in the University buildings. Where is each best developed in the United States, and what are the common defects for building purposes?

54. Relative architectural value of different species of granite.

55. Why is red sandstone often more durable than many kinds containing less iron?

56. Review the geological history and distribution of *marbles.*

II. GEOGNOSY AND PALÆONTOLOGY—PROFESSOR COMSTOCK AND MR. SIMONDS.

[*This list covers in a very general manner the course of work*

performed by under-graduates, some portion of which is required each term of all students in the laboratory.]

1. Classify as far as *genera*, the rocks and fossils placed before you. (Not less than forty specimens of each, without arrangement, and with labels concealed.)

2. Give the mineral ingredients of five rocks (selected by the examiner) and state all you can justly infer as to their genesis and subsequent history.

3. Illustrate by specimens (chosen by the student from the University collections) the differences in *granitic*, *trappean* and *volcanic* rocks.

4. Write an essay on the geognosy of the Chemung formation in the vicinity of Ithaca, based upon your own field notes.

5. Model in clay or wax a given local area, showing clearly the geological structure upon which the topography depends.

6. Point out the principal parts of one representative of each *Class* of fossils in your tray. (Specimens selected by the student from a number furnished by the examiner.)

7. Describe the fossil given you, after drawing it carefully, and show its biological and stratigraphical relations.

8. Write an essay on the life of the Hamilton Epoch, based upon your own field notes.

9. Collect the fossils from a given local block (say from a cubic yard of the Chemung formation) and prepare a report upon your observations in the field and laboratory.

III. PALÆONTOLOGY—INSTRUCTOR SIMONDS.

1. Give diagram, name and describe the different parts of a Trilobite.

2. Of what formations are the following species characteristic: *Lychas Boltoni*, *Phacops bufo*, *Dalmanites limulurus?*

3. Name the different families of *Brachiopoda*. (The student to select from a number of specimens representatives of each family.)

4. Name and describe the characteristic *Brachiopoda* of the Hamilton Group.

5. Tell all you know of the *Strophomenidæ*.

DEGREES AND PRIZES.

FOR 1876–7.

NINTH ANNUAL COMMENCEMENT.

THURSDAY, JUNE 21, 1877.

The Lord's Prayer.

1. ORATION: Assumptions in Political Science,
   CHARLES MARION COOPER, *Indianapolis, Ind.*
2. * THESIS IN MECHANIC ARTS: Style in Engineering Construction, WILLARD EUGENE LAPE, *Troy*
3. * THESIS IN SCIENCE: The Criminal and the State,
   MARGARETTA JANE SINTON, *Ithaca*
4. * THESIS IN CIVIL ENGINEERING: Investigation of the Different Theories of Leveling,
   WALTER JUSTIN SHERMAN, *Norwalk, O.*
5. LITERARY ESSAY: Heinrich Heine,
   JACOB AUGUSTUS LOOS, *Philadelphia, Pa.*
6. ESSAY IN AGRICULTURE: Forests, and their Climatic Influence, CHARLES MELVILLE BEAN, *McGrawville*
7. * THESIS IN CIVIL ENGINEERING: Jetties at the South Pass of the Mississippi,
   WILLIAM BRYANT THROOP, *Hamilton*
8. * THESIS IN MATHEMATICS: The Line at Infinity,
   EDWARD HERENDEN PARMER, *Rochester*
9. * THESIS IN ZOOLOGY: The Cayuga Lake Cottoid,
   SIMON HENRY GAGE, *Worcester*
10. ORATION: The Genius of Thomas Carlyle,
    WILLARD GENTLEMAN, *Ottawa, Ill.*
11. ORATION: Historical Continuity,
    WILLIAM EDWARD LUCAS, *Groves, Ind.*
12. * THESIS IN ARCHITECTURE: Brunelleschi's Dome,
    HOWLAND RUSSEL, *Ithaca*
13. * THESIS IN CIVIL ENGINEERING: Milwaukee Water-Works, LOUIS MORRIS MANN, *Milwaukee, Wis.*
14. * THESIS IN BOTANY; Some Forms of Saprolegnieæ,
    FRANK BROOKS HINE, *Edon, O.*

* Not read.

15. ESSAY IN ARCHITECTURE: Ecclesiastical Gothic Architecture,
ARTHUR LUDWIG KARL VOLKMAN, *New York City*
16. ORATION: "The Sun never sets,"
IDA BRUCE, *New York City*
17. * THESIS IN CIVIL ENGINEERING: Investigations of the Theory of Least Squares as applicable to Modern Geodesy, DAVID JOSEPH MACPHERSON, *Bay City, Mich.*
18. * THESIS IN MECHANIC ARTS: Some Developments in Steel Processes and Steel Philosophy,
JOHN SAYLER COON, *Burdett*
19. WOODFORD ORATION. The Funeral Orations of Brutus and Antony in Shakespeare,
GEORGE WASHINGTON GILLETT, *Villanova*

Presentation of Prizes.

Conferring of Degrees and Certificates by the Acting President.

BENEDICTION.

DEGREES CONFERRED IN 1877

The following is a list of those who received degrees at the annual Commencement at the close of the ninth academic year, together with the degrees conferred and the residence of each recipient: —

FIRST DEGREES.

BACHELORS OF ARTS, (5).

IDA BRUCE,	New York City.
HENRY WARD FOSTER,	Ithaca.
BENJAMIN HERSHEY GROVE,	Buffalo.
EMMA JANE SELLEW,	Dunkirk.
MARTHA CAREY THOMAS,	Baltimore, Md.

BACHELORS OF LITERATURE, (2).

WILLIAM RICHARD DOBBYN,	Shetland, Canada.
EDITH MAY VAN DUSEN,	Geneva.

BACHELORS OF PHILOSOPHY, (8).

PERRY DANIEL CLARK,	Forrestville.
GEORGE WASHINGTON GILLETT.	Villanova.
WILLIAM EDWARD LUCAS,	Groves, Ind.
EVERETT O'NEILL,	Savannah.
FRANK PATRICK,	New Philadelphia, O.
SAMUEL MCKEE SMITH,	Winfield.

* Not read.

JOHN CHILES HOUSTON STEVENSON,	St. Louis, Mo.
CHARLES FORSYTH WILSON,	Ithaca.

BACHELORS OF SCIENCE, (21).

JENNY BELL BEATY,	Salem.
ANNIS SMITH CARMAN,	Ithaca.
CHARLES SIMEON COBB,	Andover.
CHARLES MARION COOPER,	Indianapolis, Ind.
FRANK DWIGHT CRIM,	Mohawk.
WALDO EMERSON DENNIS,	Amanda, O.
WILLARD GENTLEMAN,	Ottawa, Ill.
WILLIAM STEWART GIFFORD,	Jamestown.
MERRITT ELVIN HAVILAND,	Glen's Falls.
LELAND OSSIAN HOWARD,	Ithaca.
AUGUSTUS JACOB LOOS,	Philadelphia, Pa.
CHARLES BAKER MANDEVILLE,	Elida, Ill.
JAMES STANLEY MILFORD,	New York City.
IRA HENRY MYERS,	Nunda Station.
EDWARD HERENDEN PALMER,	Rochester.
FERDINAND VAN DERVEER SANFORD,	Warwick.
ELROY DELOS SHERMAN,	Cleveland, O.
MARGARETTA JANE SINTON,	Ithaca.
HECTOR HILGARD TYNDALE,	Springfield, Ill.
DE FOREST VAN VLEET,	Candor.
HAMILTON SALISBURY WHITE,	Syracuse.

IN NATURAL HISTORY, (B. S.) (3).

SIMON HENRY GAGE,	Worcester.
FRANK BROOKS HINE,	Edon, O.
FRANK PETERS WEEKS,	Pittsburgh, Pa.

BACHELORS OF AGRICULTURE, (2).

CHARLES MELVILLE BEAN,	McGrawville.
FREDERICK MOSES PENNOCK,	Ithaca.

BACHELORS OF ARCHITECTURE, (7).

ALBERT FRANK BALCH,	St. Johnsbury, Vt.
WILLIAM LLOYD DEMING,	Salem, O.
DAVID WOODBURY KING,	Chateaugay Lake.
CHARLES TOWN MOULD,	Utica.
THEODORE BARNARD PECK,	Bristol, Ct.
HOWLAND RUSSELL, A.B.,	Ithaca.
ARTHUR LUDWIG KARL VOLKMAN,	New York City.

BACHELORS OF CIVIL ENGINEERING, (15).

WILLIS CHESTER AMES,	Whitney's Point.
JOHN AYLEN,	Aylmer, Can.
WILLIAM ELY BRAMHALL,	Jersey City, N. J.
ANTONIO EPAMINONDAS DE MARIE FROTA,	Cearà, Brazil.
DAVID JOSEPH MACPHERSON,	Bay City, Mich.
LOUIS MORRIS MANN,	Milwaukee, Wis.
THEODORE LUQUEER MEAD,	New York City.
DOMINGOS CORREA DE MORAES,	S. Paulo, Brazil.
JOHN NELSON OSTROM,	East Randolph.
WALTER JUSTIN SHERMAN,	Norwalk, O.
EUGENE RAYMOND SMITH,	Islip.
HOWARD THOMAS,	Stowe, Vt.
WILLIAM BRYANT THROOP,	Hamilton.
ADDISON SEBRY TIBBETS,	Belfast.
JOAQUIM VIEGAS-MUNIS,	Piracicaba, Brazil.

BACHELORS OF MECHANICAL ENGINEERING, (7).

JOHN SAYLER COON,	Burdett.
LEOPOLD EIDLITZ,	New York City.
WILLARD EUGENE LAPE,	Troy.
AMOS BUSH MCNAIRY,	Cleveland, O.
FRANKLIN OUTERBRIDGE,	Bermuda, W. I.
LYMAN EUGENE WARE,	Wrentham, Mass.
JOHN SAYLES WATERMAN,	Cumberland Hill, R. I.

SECOND DEGREES.

MASTERS OF ARTS, (2).

EUGENE FRAYER, A.B.,	Cornell.
THEODORE STANTON, A.B.,	Cornell.

DOCTOR OF PHILOSOPHY, (1).

CHARLES W. FOOTE, M.A.,	Cornell.

MASTERS OF SCIENCE, (3).

DUDLEY R. HORTON, B.S.,	Cornell.
PHILIP H. PERKINS, B.C.E.,	Cornell.
CHARLES H. WILLMARTH, Agr.B.,	Cornell.

CIVIL ENGINEERS, (2).

LOUIS FALKENEAU, B.C.E.,	Cornell.
REUBEN B. FOSTER, B.C.E.,	Cornell.

PRIZES AWARDED.

The following is a list of prizes awarded in the University during the ninth academic year—1876–7:—

1. Woodford Prize—a gold medal—Geo. W. Gillett.
2. First Horace K. White prize in Veterinary Science, twenty dollars, Arthur E. Beardsley.
3. Second Horace K. White prize in Veterinary Science, ten dollars, Charles M. Bean.

PRIZES FOR UNDERGRADUATES.

The following prizes are offered for the year 1877–8.

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford prize the present year are as follows:

1. Individual Manhood as an Influence in History.
2. The Trust in Ideas.
3. The Moral Tendencies fostered by Science.
4. The Poetic Genius of Aeschylus and Milton.
5. Milton's Satan and Goethe's Mephistopheles.
6. The Imagination in Moral and Historical Judgment.
7. The Characteristic Features of an Age of Transition.
8. The Modernness of Ancient Athenian Life.
9. The Immortality of Art.
10. Kingship in Shakespeare's Kings.
11. A Farmer and a Man on the Farm.
12. The Modern Epic—not "Arms and the Man," but "Tools and the Man."

THE HORACE K. WHITE PRIZE.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars;* to the second in merit, *Ten Dollars.*

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

ARTICLE I.

1. There shall be two standing committees, an executive committee and an auditing committee.

2. The executive committee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

4. The order of business at each regular meeting shall be as follows:—

(*a*) The secretary shall ascertain the names of the members present by roll call or otherwise.

(*b*) Reading the minutes of the last meeting.

(*c*) Treasurer's report and the referring of it to the auditing committee.

(*d*) Report of the executive committee.

(*e*) Reports of special committees.

(*f*) Miscellaneous business.

(*g*) Election of officers and committees.

(*h*) Election of Trustee or Trustees.

(*i*) Adjournment.

ARTICLE 2.

1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not herein before provided for, shall be elected as follows: The president by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of New York, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1877–8.

President—L. H. BARNUM, '71.

Vice-Presidents—O. F. WILLIAMS, '69; A. A. ANDREWS, '70; S. F. HUNTLEY, '71; D. M. PAGE, '72; H. ALTMAN, '73; E. O. RANDALL, '74; V. L. DAVEY, '75; C. H. ESTY, '76.

Recording Secretary and Treasurer—G. W. HARRIS.

Corresponding Secretary—S. SMITH.

Executive Committee—J. H. COMSTOCK; H. NORTHRUP; C. L. SMITH; S. SMITH; G. W. HARRIS.

Auditing Committee—W. D. L. WILSON; J. G. MOORE; C. B COON.

Orator—J. F. CLUCK.

Alternate—J. FRANKENHEIMER.

Poet—C. F. ALLEN.

Alternate—A. N. FITCH.

TRUSTEE ELECTED.

STEWART L. WOODFORD.

MEMBERS OF THE ASSOCIATION.

GRADUATED IN 1869. [8]

* The star denotes deceased graduates.

G. F. Behringer, A. B.
M. B. Buchwalter, A. B.
J. B. Foraker, A. B.
C. F. Hendryx, A. B.
J. Kirkland, A. B.
J. A. Rea, A. B.
D. W. Rhoades, A. B.
O. F. Williams, A. B.

GRADUATED IN 1870. [24]

A. A. Andrews, B. S.
S. S. Avery, B. S.
J. S. Butler, B. S.
J. J. Chambers, Ph. B.
T. B. Comstock, B. S.
B. V. B. Dixon, A. B.
E. Douglas, A. B.
H. T. Eddy, C. E., (Ph. D., '72).
A. R. Greene, A. B.
S. D. Halliday, A. B.
E. D. Jackson, Ph. B.
H. V. L. Jones, Ph. B.
G. H. Lothrop, Ph. B.
G. M. Luther, B. S.
J. L. Maxwell, Ph. B.
P. Mosher, A. B.
C. J. Powers, B. S,
C. L. Powers, B. S.
E. F. Robb, A. B.
M. M. Ross, B. S.
P. G. Schoeder, Ph. B.
T. W. Spence, A. B.
C. A. Storke, A. B.
F. Walters, Ph. B.

GRADUATED IN 1871. [40]

W. S. Barnard, B. S.
L. H. Barnum, Ph. B.
G. A. Benton, A. B.
P. C. J. De Angelis, A. B.
A. B. Doerflinger, B. C. E.

A. H. Edgren, Ph. B.
W. Farnham, B.C. E., (C. E.,'74).
A. N. Fitch, Ph. B.
O. Gillett, B. C. E.
E. J. Hadley, B. S.
W. H. Hayes, B. S.
I. Hoagland, B. S., (Ph. B., '72).
S. F. Huntley, B. S.
K. W. Ingham, Ph. B.
G. W. Ingraham, A. B.
M. Kasson, B. V. S.
R. O. Kellogg, Ph. B.
E. D. Leffingwell, B. S.
J. J. Lockhart, B. S.
J. M. McNair, B. S.
W. S. McGregor, B. S.
J. E. More, A. B.
M. J. Morse, Ph. B.
J. O'Neill, A. B.
E. L. Parker, A. B.
C. E. Reeves, B. S.
F. H. Remington, B. S.
A. J. Rogers, Ph. B.
W. P. Ryman, B. S.
S. W. Salmon, B. C. E.
F. Schoff, B. C. E.
A. H. Sewell, B. S.
F. Sherman, B. S.
G.L.T.Smith, B.C.E., (C.E.,'74).
M. A. Smith, B. C. E.
R. G. H. Speed, Ph. B.
R. Taft, B. S.
W. H. Tallmadge, A. B.
C. E. Van Cleef, B. S.
W. DeL. Wilson, A. B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph. B.
M. C. Bean, B. C. E.
C. H. Blair, A. B. (A.M.,'76).
D. W. Bowman, B. C. E.
E. L. Brady, B. S.
G. F. Breed, Ph. B.
H. S. Buffum, B. S.
J. M. Chase, B. S.
I. E. Clark, B. C. E.
A. C. Clement, B. S.
A. W. Clinton, B. S.
D. Colburn, B. C. E.
M. T. Conklin, B. S.
H.E.Copeland, Ph.B.,(M.S., '75).
C. L. Crandall, (C.E.,'76).
C. S. Crofoot, Ph. B.
Gram Curtis, B. C. E.
D. M. Darrin, B. S.
L. A. Foster, B. S.
F. W. Frost, B. C. E.
A. N. Fuller, B. S.
W. Harkins, B. S., (B. Lit., '73).
R. Headley, B. S.
H. C. Henderson, B. C. E.
I. N. L. Heroy, B. S.
W. E. Holcomb, B. S.
F. Holden, A. B.
R. B. Howland, B. C. E.
J. H. Hurd, B. S.
E. W. Hyde, B. C. E., (C. E.,'74).
G. A. Iselin, B. S.
D. S. Jordan, M. S.
L. F. Judson, B. S.
M. Kellogg, B. S.
J. B. Lawrence, Ph. B.
W. N. B. Lawton, Ph. B.
W. B. Leach, B. S.
J. W. Mack, B. S.
J. T. McCollum, B. S.
T. J. McConnon, B. S.
E. E. McElroy, B. S.
F. D. Nash, B. S.
E. Nicoll, B. S.
W. H. Niles, B. S.
A. Osborn, A. B.
D. M. Page, B. S.
M. G. Peters, B. S.
A. C. Pike, B. S.
G. W. Pitts, B. S.
*H. G. Pollock, B. S.
C. S. Price, B. C. E.
A. L. Rader, Ph. B.
A. Rogers, B. C. E.
D. E. Salmon, (D.V.M.,'76).
T. Sanderson, A. B.
W. I. Scott, B. S.
G. P. Serviss, B. S.
C. B. Sill, B. C. E.
*C. Smith, B. S.
L. P. Smith, B. S., (Ag. B., '74)

M. G. Stolp, B. C. E.
S. P. Thomas, B. C. E.
J. E. Van De Carr, B. S.
J. DeW. Warner, Ph. B.
A. C. Weeks, B. S.
S. N. Williams, B. C. E.
E. V. Wilson, B. S.
T. H. Wolford, B. S.
W. J. Youngs, B. S.

GRADUATED IN 1873. [95]

C. F. Allen, B. C. E.
H. Altman, B. S.
R. Anderson, B. M. E.
J. C. Averill, B. S.
A. B. Aubert, B. S.
R. Bacon, B. S.
E. Bartley, B. S.
S. F. Belknap, B. S.
H. E. Blake, B. C. E.
L. G. Boies, A. B.
I. W. Boothby, B. S.
S. W. Brown, B. S. (C.E.,'76).
Frank Carpenter, B. C. E.
F. H. Carver, B. S.
A. B. Cauldwell, B. S.
J. Chamberlin, B. S.
J. P. Church, B. C. E.
J. T. Cothran, A. B.
W. H. Denham, B. S.
O. A. Derby, B. S., (M. S., '74).
Geo. Devin, B. C. E.
*E.T.Diefendorff, B. S.
E. G. Donaldson, B. Lit.
G. F. Dudley, B. S.
W. F. Duncan, B. S.
E. S. Eastman, Ph. B.
L. Elsbree, A. B.
L. Everett, B. S.
J. B. Ewell, B. S.
L. Falkeneau, B.C.E. (C.E.,'77).
F. B. Ferriss, B. S.
P. D. Finnegan, A. B.
C. Finster, A. B.
N. K. Foster, B. S.
J. Frankenheimer, Ph. B.
M. R. Frazer, A. B.
A. Gridley, B. S.
F. N. Hagar, A. B.
F. W. Halsey, B. S.
G. W. Harris, Ph. B.
A. C. Harwick, B. S.
J. W. Hill, B. M. E.
G. W. Horner, B. C. E.
E. M. Howard, B. S.
A. T. Hyde, B. C. E.
H. C. Johnson, A. B.
*F. H. Jones, B. Lit.
C. S. Joy, A. B.
F. W. Kelley, A. B., (Ph.D., '74).
W. L. Klein, B. S.
F. J. Knight, B. C. E.
J. M. Knowles, B. S.
D. E. Kohler, A. B.
C. Y. Lacy, Agr. B.
C. F. Lane, A. B.
D. T. Lawson, B. C. E.
W. Leland, B. S.
C. E. Lipe, B. M. E.
R. H. Lockwood, B. C. E.
G. F. Lyman, B. C. E.
D. W. J. Mesick, B. S.
J. L. Moffatt, B. S.
J. G. Moore, A. B.
G. C. Morehouse, B. S.
W. T. Morris, B. S.
J. G. Newkirk, A. B.
C. D. Page, B. S.
R. Parmely, B. S.
F. Parson, B. C. E.
G. E. Patrick, B. S., (M. S., '74).
G. H. Phelps, B. S.
A. H. Phinney, (B. S.,) Ph. D.
*K. Preston, B. C. E.
F. W. Proctor, B. S.
F. J. Root, B. C. E.
J. R. Schoonover, Arch. B.
E. H. Scofield, A. B.
J. F. Seybolt, B. S.
M. C. Sharp, Ph. B.
M. A. Shotwell, Ph. B.
C. D. W. Smith, B.S., (M.S., '75).
C. L. Smith, B. S.
S. Smith, B. S.
W. H. Smith, A. B.
H. L. Sprague, B. S.
W. L. Sprague, A. B.

*G. A. Tilley, B. C. E.
W. Tinning, B. S.
J. H. Tompkins, B. C. E.
G. B. Turner, B. S.
M. W. Van Auken, A. B.
C. F. Wheelock, B. S.
T. S. White, B. C. E.
T. Worthington, Ph. B.

GRADUATED IN 1874. [64].

F. B. Alexander, B. C. E.
Geo. Berry, Arch. B. (Arch.,'76)
N. W. Cady, Ph. B.
C. W. Candee, B. S.
J. D. Case, B. S.
J. F. Cluck, A. B.
J. H. Comstock, B. S.
F. W. Cooper, Arch. B.
O. H. P. Cornell, C. E.
J. A. Dobroluboff, B. C. E.
W. R. Dudley, B. S. (M.S.,'76)
H. L. R. Fairchild, B. S.
W. R. Fitch, B. C. E.
S. P. Fleming, A. B.
W. H. Flint, A. B.
R. B. Foster, B. C. E. (C.E.,'77)
L. M. Fulton, B. S.
Wallace Green, B. C. E.
H. M. Gillett, B. S.
T. Hampson, Lit. B.
J. T. Hay, B. S.
B. A. Hayes, Lit. B.
L. T. Henderson, Ph. B.
H. M. Hibbard, B. C. E.
H. L. House, A. B.
J. T. Hurd, B. S.
W. H. Janney, B. C. E.
E. F. P. Jordao, B. C. E.
W. A. Kellerman, B. S.
H. M. Kennedy, Lit. B.
B. W. Law, Arch. B.
C. H. Lay, B. C. E.
W. R. Lazenby, Agr. B.
H. G. Northrup, B. C. E.
J. H. Pierce, B. S.
E. M. Pitts, B. S., (M. S., '75).
C. A. Preston, B. S.
E. O. Randall, Ph. B.
W. M. J. Rice, Arch. B.
H. B. Robinson, B. C. E.
B. E. Shear, Arch. B.
G. S. Sheppard, B. S.
W. M. Smith, B. S.
W. N. Smith, B. M. E.
C. W. Soulby, B. S.
J. H. Southard, B. S.
A. C. Standart, B. S.
J. L. Stone, Agr. B.
W. Swaty, B. S.
W. P. Thompson, B. S.
L. P. Tier, B. C. E.
S. E. Todd, Arch. B.
F. C. Tomlinson, B. C. E.
G. B. Upham, B. S.
J. D. Upham, B. S.
M. Van Cleef, B. S.
G. R. Van De Water, B. S.
C. W. Wasson, B. C. E.
F. W. Warthorst, B. C. E.
R. H. Wiles, B. S.
G. T. Winston, Lit. B.
C. C. Wood, B. S.
F. C. Wood, B. S.

GRADUATED IN 1875. [52].

W. O. Bates, Ph. B.
A. A. Beattie, B. M. E.
H. P. Bellows, B. S.
E. T. Betts, B. S.
A. R. Bradford, B. S.
A. W. Bulkley, Arch. B.
S. J. Bunting, B. M. E.
C. F. Burt, B. S.
S. W. Carpenter, Ph. B.
I. N. Cook, B. C. E.
E. Corson, B. S.
V. L. Davey, A. B.
J. W. Dean, B. S.
O. W. Ferguson, B. C. E.
G. H. Fitch, B. S.
E. L. B. Gardiner, B. M. E.
E. George, B. C. E.
A. R. Gillis, B. M. E.
A. C. Green, B. C. E.

C. S. Harmon, B. S.
O. Harris, B. S.
F. Hatch, A. B.
F. H. Hiscock, A. B.
D. R. Horton, B. S.
I. E. Hutton, Arch. B.
E. Jackson, B. S.
C. C. King, Arch. B.
H. B. Knight, A. B.
M. H. Ladd, A. B.
M. D. Makepeace, B, C. E.
G. S. Moler, B. M. E.
J. T. Newman, Ph. B.
E. L. Nichols, B. S.
P. H. Perkins, B. C. E.
E. D. Preston, B. C. E.
E. J. Preston, B. S.
H. H. Roberts, Ph. B.
E. K. Rossiter, Arch. B.
H. W. Sackett, A. B.
A. F. Shaw, B. S.
F. W. Simonds, B. S. (M. S., '76).
F. P. Smith, B. S.
F. P. Stevens, B. S.
W. M. Sturges, Agr. B.
G. Tatnall, B. C. E.
J. J. Thomas, A. B. (A. M., '76).
G. R. Thompson, B. S,
W. J. Thompson, B. S.
D. J. Tomkins, Ph. B.
V. S. Walsh, B. S.
F. P. Wheeler, B. S.
J. Worthington, A. B.

GRADUATED IN 1876. [65]

J. M. Ashley, B. S.
C. P. Aylen, B. C. E.
C. Barclay, B. S.
Carlos P. de Barros, B. C. E.
W. J. Berry, A. B.
G. Boardman, B. M. E.
C. T. Brewer, Ph. B.
J. T. Brown, B. M. E.
F. de A, V. Bueno, B. C. E.
J. K. Cady, Arch. B.
C. F. Carpenter, B. M. E.
E. F. Church, B. M. E.
M. R. Conable, B. C. E.
C. B. Coon, B. S.
S. H. Coon, A. B.
E. L. Crandall, B. S.
S. S. Eddy, B. S.
*A. F. Eidlitz, B. C. E.
C. H. Esty, A. B.
W. F. Farmer, B. C. E.
D. F. Flannery, B. S.
C. W. Foote, A. B., M. A., (Ph. D, '77.)
A. W. Foster, A. B., M. A.
E. Frayer, A. B. (A. M., '77).
M. M. Garver, B. S.
H. McC. Hadley, Arch. B.
F. E. Heath, B. S.
A. Z. Kent, B. M. E.
W. H. Kent, B. S.
F. Looney, B. S.
A. E. Maltby, B. C. E.
W. G. McDowell, A. B
J. C. McMullen, B. C.
R. L. Moore, B. S.
F. W. Noyes, Ph. B.
L. B. Palmer, B. S.
W. H. Parker, Arch. B.
C. R. Parkhurst, B. S.
J. Parmelee, B. S.
C. W. Raymond, B. C. E.
H. J. Rice, B. S.
W. K. Roy. B. S.
H. A. Rueppele, B. S.
H. Russel, A. B.
C. F. Saunders, Arch. B.
H. B. Seeley, Arch. B.
H. H. Seymour, B. S.
T. Stanton, A. B. (A. M., '77).
J. H. Stubbs, B. C. E.
J. W. Sturdevant, B. S.
S. P. Sturges, A. B.
W. P. Sturges, B. S.
J. B. Tarleton, Arch. B.
F. E. Taylor, B. M. E.
H. Terry, B. S.
E. D. Thompson, B. C. E.
H. C. Tilden, Lit. B.
C. A. Van Velzer, B. S.
E. A. Wagner, B. S.
C. E. Washburne, Ph. B.
C. B. Wheelock, B. C. E.

C. P. Woodruff, B. S.
R. Yatabe, B. S.
F. O. Young, B. S.

GRADUATED IN 1877.

W. C. Ames, B. C. E.
J. Aylen, B. C. E.
A. F. Balch, Arch. B.
C. M. Bean, Agr. B.
J. B. Beatty, B. S.
W. E. Bramhall, B. C. E.
Ida Bruce, A. B.
A. S. Carman, B. S.
P. D. Clark, Ph. B.
C. S. Cobb, B. S.
C. M. Cooper, B. S.
J. S. Coon, B. M. E.
F. D. Crim, B. S.
W. L. Deming, Arch. B.
W. E. Dennis, B. S.
W. R. Dobbyn, Lit. B.
L. Eidlitz, B. M. E.
H. W. Foster, A. B.
A. E. Frota, B. C. E.
S. H. Gage, B. S.
W. Gentleman, B. S.
W. S. Gifford, B. S.
G. W. Gillett, Ph. B.
B. H. Grove, A. B.
M. E. Haviland, B. S.
F. B. Hine, B. S.
L. O. Howard, B. S.
D. W. King, Arch. B.
W. E. Lape, B. M. E.
A. J. Loos, B. S.
W. E. Lucas, Ph. B.
L. M. Mann, B. C. E.
A. B. McNairy, B. M. E.
T. L. Mead, B. C. E.
J. S. Milford, B. S.
D. C. Moraes, B. C. E.
C. T. Mould, Arch. B.
I. H. Myers, B. S.
E. O'Niel, Ph. B.
J. N. Ostrom, B. C. E.
F. Outerbridge, B. M. E.
E. H. Palmer, B. S.
F. Patrick, Ph. B.
T. B. Peck, Arch. B.
F. M. Pennock, Agr. B.
H. Russel, (A. B.) Arch. B.
F. V. D. Sanford, B. S.
E. J. Sellew, A. B.
E. D. Sherman, B. S.
W. J. Sherman, B. C. E.
M. J. Sinton, B. S.
E. R. Smith, B. C. E.
S. M'K. Smith, Ph. B.
J. C. H. Stevenson, Ph. B.
H. Thomas, B. C. E.
M. C. Thomas, A. B.
W. B. Throop, B. C. E.
A. S. Tibbets, B. C. E.
H. H. Tyndale, B. S.
E. M. Van Dusen, Lit. B.
D. F. Van Vleet, B. S.
J. Viegas-Munis, B. C. E.
A. L. R. Volkman, Arch. B.
E. L. Ware, B. M. E.
J. S. Waterman, B. M. E.
F. P. Weeks, B. S.
H. S. White, B. S.
C. F. Wilson, Ph. B.

PREPARATORY SCHOOL.

The Calendar of the **Preparatory School** *conducted by Professors* MACKOON *and* WAIT *is the same as that of the Cornell University, with one term additional beginning in June, on the Wednesday following the annual Commencement of the University.*

Thorough instruction is given, to classes, or to single pupils, in the studies of any of the preparatory courses, and in the Languages and Mathematics required in any of the departments of the University. Inquiries may be addressed to either of the undersigned, Ithaca, N. Y.

B. P. MACKOON. L. A. WAIT.

ALPHABETICAL LIST OF STUDENTS.

SPRING TERM, 1877.

Adams E. S. Chicago, Ill.
Optional, Fr.
Ainslie J. S. Hartwick
Arts, Fr.
Alberti W. M. New Market, N. J.
Sc & Let, Jr.
Allen J. G. Aurora
Mechanic Arts, Fr.
Alling R. B. Bangall
Optional, Fr.
Allison C. R. Oswego
Sc & Let, Soph.
Ames C. W. Germantown, Pa.
Literature, Sr.
Arnold G. Rochester
Sc & Let, Soph.
Arrigunaga de J. G. New Orleans, La.
Agriculture, Soph.
Atwood C. Moravia
Agriculture, Soph.
Atwood C. E. Ithaca
Sc & Let, Soph.
Ayers G. Vennant, Ill.
Philosophy, Soph.
Ayres W. J. Cairo, Ill.
Optional, Fr.
Aylen H. Aylmer, Canada
Sc & Let, Fr.

Babcock C. E. P. Manlius
Mechanic Arts, Soph.
Babcock J. W. Jamestown
Arts, Sr.
Bacon C. P. Hartford, Ct.
Philosophy, Jr.
Bailey H. Caughdenoy
Sc & Let, Jr.
Bailey L. Wellsboro, Pa.
Arts, Soph.
Baker E. Ithaca
Sc & Let, Sr.
Baker G. T. Iowa City, Ia.
Engineering, Jr.
Baker W. A. Yaphank
Sc & Let, Soph.
Bakes R. O. Vevay, Ind.
Agriculture, Jr.
Ballard A .H. Syracuse
Sc & Let, Sr.
Ballard S. T. Louisville, Ky.
Sc & Let, Sr.
Barnard P. Lakeview, Ill.
Sc & Let, Sr.
Barros F. F. de. S. Paulo, Brazil
Engineering, Jr.
Barros-Paes F. de S. Paulo, Brazil
Engineering, Jr.
Bates W. H. Washington, D. C.
Agriculture, Fr.
Battin H. W. Albany
Engineering, Fr.
Baxter F. E. St. Louis, Mo.
Engineering, Soph.
Beahan W. Watkins
Engineering, Sr.
Beardsley A. E. Cayuga, Ill.
Natural History, Sr.
Beckwith J. D. Cedarville
Sc & Let, Soph.
Benchley P. Z. Ithaca
Agriculture, Jr.
Benedict T. Pittston, Pa.
Engineering, Fr.
Benham G. W. Norwalk, O.
Sc & Let, Soph.
Bird W. N. D. Ithaca
Agriculture, Soph.
Bissell E. C. South Bend, Ind.
Sc & Let, Soph.

Bissell F. E. South Bend, Ind.
Engineering, Sr.
Bissinger W. New York City
Optional, Jr.
Bliss H. D. Holley
Agriculture, Soph.
Blowers C. N. Syracuse.
Optional, Sr.
Booth Q. W. Rochester
Mechanic Arts, Fr.
Borden J. M'K. Washington, D. C.
Mechanic Arts, Sr.
Bowman S. L. New Lisbon, O.
Optional, Fr.
Boyer A. G. Aurora
Optional, Soph.
Boyer I. D. Dayton, O.
Mechanic Arts, Fr.
Brader W. B. White Haven, Pa.
Optional, Fr.
Bradley W. C. Cedar Rapids, Ia.
Sc & Let, Soph.
Bredin G. S. Butler, Pa.
Sc & Let, Fr.
Breed W. B. Phoenix
Chemistry, Sr.
Brown H. K. Syracuse
Sc & Let, Soph.
Brown W. C. Sandusky, O.
Mechanic Arts, Fr.
Bruen F. Dayton, O.
Engineering, Sr.
Buchman A. New York City
Architecture, Jr.
Buck H. A. Watkins
Sc & Let, Soph.
Buckley H. H. Unadilla
Optional, Fr.
Bullis A. R. Macedon
Mathematics, Fr.
Burdsall E. Port Chester
Mechanic Arts, Sr.
Burr E. Newark Valley
Literature, Fr.
Burr G. L. Newark Valley
Arts, Fr.

Cady D. W. Peterborough
Arts, Sr.
Campbell E. Mumford
Optional, Fr.
Candee F. J. Moline, Ill.
Chem & Phys, Fr.
Cane A. Plattsburgh
Arts, Jr.
Carey F. Fond du Lac, Wis.
Optional, Fr.

Carll R. C. Northford
Optional, Fr.
Carman F. D. Jacksonville
Arts, Fr.
Carpenter C. R.
Leavenworth, Kan.
Natural History, Soph.
Carpenter G. Utica
Natural History, Soph.
Carpenter W. H. Utica
Optional, Soph.
Carrier W. H. Phoenix
Agriculture, Soph.
Cartwright R. H. Rochester
Mechanic Arts, Fr.
Cary E. Dunkirk
Sc & Let, Sr.
Catchpole E. W. Rose
Agriculture, Fr.
Chamberlin J. C. Carmansville
Science, Soph.
Chandler W. Weldon, Ill.
Optional, Jr.
Chapman E. L. Monroe, Mich.
Optional, Soph.
Cheek S. P. Danville, Ky.
Optional, Fr.
Cheney M. E. Bemus' Point
Optional, Fr.
Chittenden F. H. Brooklyn
Natural History, Fr.
Clarke P. E. Washington, D. C.
Optional, Fr.
Clements G. D. Philadelphia, Pa.
Natural History, Soph.
Cobb F. C. Andover
Philosophy, Soph.
Coffin J. Genoa, Neb.
Mechanic Arts, Soph.
Cole E. J. Lowell, Mich.
Optional, Soph.
Cole W. San Francisco, Cal.
Optional, Sr.
Collins H. Rochester
Science, Fr.

Collmann J. S. Freeford Falls, Ill.
Sc & Let, Fr.
Conant H. Wilmington, Del.
Sc & Let, Sr.
Conde M. F. Amsterdam
Literature, Jr.
Congdon, L. Oberlin, O.
Optional, Jr.
Conklin H. S. Poughkeepsie
Literature, Fr.
Cook C. B. Buffalo
Architecture, Soph.
Copp F. M. Jordan
Mechanic Arts, Fr.
Corbett F. J. Clayville
Sc & Let, Jr.
Cornell G. Central Valley
Optional, Fr.
Cornish A. J. Hamburg, Ia.
Optional, Jr.
Cramphin H. A. Morrisville
Sc & Let, Soph.
Crandall C. Ithaca
Chemistry & Physics, Sr.
Cummins H. A. Conneaut
Mechanic Arts, Fr.
Cunningham A.
S. Framingham, Mass.
Literature, Fr.
Curtice F. C. West Winsted, Ct.
Natural History, Fr.
Curtiss E. W. Whitewater, Wis.
Mechanic Arts, Soph.
Curtis F. S. Moravia
Sc & Let, Soph.

Davenport A. Varna
Arts, Fr.
Davis F. Ithaca
Engineering, Fr.
Day H. McH. Cooperstown
Arts, Fr.
Demorest H. C. New York City
Sc & Let, Jr.
Dewsnap S. G. Middletown
Chem & Phys, Jr.
De Witt B. B. Owego
Arts, Sr.
Dominick D. W. C. Gallupville
Optional, Fr.
Dounce G. A. Elmira
Arts, Jr.
Downing E. Ithaca
Sc & Let, Fr.
Drake J. C. M. Westfield
Natural History, Soph.
Dyson J. New Britain, Ct.
Engineering, Sr.

Eastman A. L. Arcade
Optional, Fr.
Eaton G. P. Oxford
Sc & Let, Sr.
Eberman F. P. Strasburg, Pa.
Sc & Let, Soph.
Edwards W. S. Coalburg, W. Va.
Sc & Let, Jr.
Ehrlicher F. M. Watertown
Sc & Let, Fr.
Eidlitz O. M. New York
Engineering, Fr.
Elliott G. R. Auburn
Optional, Fr.
Elstun V. Cincinnati, O.
Agriculture, Fr.
Eustis G. New Orleans, La.
Mechanic Arts, Fr.
Everson C. B. Syracuse
Sc & Let, Sr.
Ewing A. L. La Grange, Wis.
Sc & Let, Fr.

Falkeneau A. New York City
Mechanic Arts, Sr.
Farquhar R. H. Little Rock, Ark.
Optional, Soph.
Ferguson N. E. Stockholm, N. J.
Engineering, Jr.
Ferris G. F. Philadelphia, Pa.
Engineering, Fr.
Finch W. A. Ithaca
Arts, Soph.
Fishel F. E. Patchogue
Literature, Soph.
Flannigan J. R. Binghamton
Arts, Soph.
Flannigan W. J. Binghamton
Arts, Fr.
Fleischman A. Albany
Architecture, Jr.
Fleming G. C. Ithaca
Arts, Soph.
Fleming M. M. Ithaca
Literature, Jr.

Forbes L. E. Mayville, Wis.
Sc & Let, Soph.
Force L. Tekama, Neb.
Sc & Let, Soph.
Foster C. E. Ithaca
Agriculture, Fr.
Fox W. H. Portland, Me.
Agriculture, Soph.
Frear L. B. Ithaca
Sc & Let, Soph.
Fuller H. A. New York City
Optional, Soph.

Gardner W. Syracuse
Sc & Let, Soph.
Gaunt T. T. Poughkeepsie
Optional, Soph.
Gelatt R. B. Keokuk, Ia.
Sc & Let, Jr.
Gibson S. J. South New Berlin
Science, Jr.
Giddings L. J. Jefferson, O.
Sc & Let, Jr.
Gifford G. F. Jamestown
Sc & Let, Soph.
Gifford H. Milwaukee, Wis.
Natural History, Jr.
Gilbert R. M. Le Roy
Literature, Fr.
Glascock J. L. Philippi, W. Va.
Arts, Fr.
Goodwin D. W. Dresserville
Literature, Soph.
Gottheil W. S. New York City
Natural History, Sr.
Green E. Utica
Architecture, Sr.
Green H. L. South Byron
Sc & Let, Jr.
Green R. P. Media, Pa.
Engineering, Soph.
Gregory E. L. Buffalo
Literature, Jr.
Gregory E. W. Palmyra
Engineering, Jr.
Greve A. St. Louis, Mo.
Arts, Fr.
Gusdorf M. Fremont, O.
Philosophy, Fr.

Haight J. A. Oshkosh, Wis.
Arts, Jr.
Hall C. St. Louis, Mo.
Optional, Fr.
Halpen A. M. Albany
Sc & Let, Soph.
Halsey D. R. Hempstead
Arts, Fr.
Halsey F. A. Unadilla
Mechanic Arts, Sr.
Hamilton J. A. Ottumwa, Ia.
Science, Soph.
Hamilton J. F. New York City
Architecture, Jr.
Hamrick J. D. Belleville, Ind.
Agriculture, Fr.
Harding F. Callicoon
Optional, Fr.
Haskell E. E. Forestville
Engineering, Jr.
Haskell G. F. Albany
Sc & Let, Soph.
Hathaway A. S. Decatur, Mich.
Science, Jr.
Havens R. W. Ellenburg
Engineering, Soph.
Hawkins C. R. East Hamburg
Optional, Soph.
Hayes R. P. Fremont, O.
Sc & Let, Soph.
Heermans F. Syracuse
Mechanic Arts, Sr.
Henry W. A. Defiance, O.
Agriculture, Soph.
Herman R. Washington, D. C.
Engineering, Jr.
Herrick W. P. East Randolph
Literature, Fr.
Heron N. J. Danville, Ky.
Optional, Fr.
Heyl H. Dunkirk
Literature, Fr.
Hicks M. Syracuse
Architecture, Jr.
Hill H. B. Rome
Literature, Soph.
Hill L. L. Isle La Motte, Vt.
Sc & Let, Soph.
Hill J. T. Warren, Pa.
Mechanic Arts, Sr.
Hill T. Richmond, Ind.
Literature, Fr.
Hills H. E. Auburn
Optional, Soph.

Hoag W. I. Aurora
Science, Fr.
Holcomb J. W. Ravenna, O.
Optional. Fr.
Hornor C. W. New Orleans, La.
Science, Fr.
Hostetler V. N. Napa City, Cal.
Sc & Let, Jr.
Howell F. J. Keokuk, Ia.
Optional, Fr.
Howland E. C. Poughkeepsie
Literature, Jr.
Howland I. Sherwood
Science, Fr.
Hoyt W. B. East Aurora
Arts, Fr.
Humphrey C. Ithaca
Sc & Let, Soph.
Hungerford N. Ithaca
Agriculture, Fr.
Hunter N. P. Jasper
Arts, Fr.
Huntley W. A. Troy
Literature, Soph.
Hutchins A. W. Ithaca
Agriculture, Soph.
Hyde C. H. Wolcott
Arts, Soph.

Ingalls W. A. Peterboro
Sc & Let, Jr.
Irvine F. Sharon, Pa.
Sc & Let, Soph.

Jackson C. C. New York City
Sc & Let, Jr.
Jackson W. E. Wilmington, Del.
Architecture, Soph.
Jarvis G. M. Canastota
Engineering, Sr.
Jaynes D. D. North Norwich
Sc & Let, Fr.
Johnson B. Ithaca
Mechanic Arts, Sr.
Johnston, W. E. Cooperstown
Arts, Soph.
Jonas A Buffalo
Optional, Soph.
Jones F. H. Trumansburg
Agriculture, Soph.
Jones L. F. Ilion
Sc & Let, Sr.

Kasson M. C. Woodstock, Ill.
Agriculture, Sr.
Keith W. Warsaw
Chem & Phys, Sr.
Kelley F. M. Philadelphia, Pa.
Literature, Soph.
Kelley I. W. Kelley's Island, O.
Mechanic Arts, Soph.
Kelley W. D. Kelley's Island, O.
Mechanic Arts, Soph.
Kelso J. S. Stamford, Ct.
Engineering, Fr.
Kendall F. M. Attica
Sc & Let, Sr.
Kendig J. S. Waterloo
Philosophy, Soph.
Kennedy J. C. Troy, Vt.
Engineering, Jr.
Kent R. S. Bay Ridge
Sc & Let, Jr.

Kerr W. C. St. Peter, Minn.
Mechanic Arts, Jr.
Kilbourn F. L. Moravia
Agriculture, Fr.
Knapp C. L. Lowell, Mass.
Architecture, Jr.
Knapp J. L. Union
Sc & Let, Soph.
Kozima N. Japan
Architecture, Jr.

Landon E. A. S. Vineland, N. J.
Optional, Soph.
Lathrop O. G. Ackworth, N. H.
Science, Soph.
Lawrence F. C. Minneapolis, Minn.
Sc & Let, Soph.
Leary J. T. Ithaca
Sc & Let, Soph.
Leeds C. S. Richmond, Ind.
Science, Soph.
Lehmaier J. S. New York City
Philosophy, Sr.
Leighton H. J. Ithaca
Mechanic Arts, Soph.
Lemen J. A. Dansville
Science, Soph.
Leonard Z. L. Providence, R. I.
Optional, Soph.
Lewis J. Ithaca
Mechanic Arts, Sr.

Locke H. L. Dedham, Mass.
Agriculture, Fr.
Lounsberry J. W. Hammondsport
Optional, Fr.
Lovelace, F. L. Dundee
Philosophy, Soph.
Lowenbein E. New York City
Architecture, Jr.
Lucas C. O. Greenville, O.
Sc & Let, Soph.
Lux C. A. Clyde
Literature, Fr.

Mack G. W. Ithaca
Mechanic Arts, Soph.
Macy E. B. Port Byron
Sc & Let, Jr.
Magner E. L. Andover
Sc & Let, Jr.
Maniere, C. E. Chicago, Ill.
Natural History, Soph.
Mann F. W. Norfolk, Mass.
Science, Sr.
Mann G. M. Milwaukee, Wis.
Agriculture, Soph.
Mann W. T. Somerset
Agriculture, Fr.
Martin A. R. Alleghany City, Pa.
Arts, Soph.
Martin G. Alleghany City, Pa.
Optional, Fr.
Marvin C. D. Montclair, N. J.
Architecture, Fr.
Marx D. Toledo, O.
Engineering, Sr.
Marx H. Toledo, O.
Mechanic Arts, Jr.
Mason M. L. Newton Centre, Mass.
Optional, Soph.
Maxwell F. A. Clymer
Engineering, Sr.
McConnell B. F. Chicago, Ill.
Optional, Fr.
McCormick C. H. Henderson, Ky.
Engineering, Sr.
McClumpha G. Amsterdam
Optional, Fr.
McDermid H. A. Hillsdale, Mich.
Mechanic Arts, Soph.
McEbright K. Millersburg, O.
Opional, Sr.

McKay W. L. Elmira
Arts, Sr.
McKinstry C. H. Canajoharie
Optional, Soph.
Meeker F. O. Franklin, W. Ter.
Sc & Let, Sr.
Mendes O. A. P. S. Paulo, Brazil
Architecture, Soph.
Merrill T. D. Saginaw City, Mich.
Engineering, Sr.
Merry A. D. Phœnix
Sc & Let, Soph.
Mersereau C. V. Union
Engineering, Jr.
Mesick D. W. Kinderhook
Engineering, Soph.
Mesick F. P. Kinderhook
Engineering, Soph.
Messenger H. J. Cortland
Literature, Soph.
Millard A. Omaha, Neb.
Sc & Let, Jr.
Millard C. K. North Adams, Mass.
Optional, Fr.
Miller I. Washington, D. C.
Literature, Fr.
Mills A. E. New York City
Architecture, Soph.
Mills H. M. Syracuse
Literature, Jr.
Moffatt E. J. Chatham
Literature, Jr.
Montignani J. F. Albany
Literature, Jr.
Monroe J. S. West Milford, N. J.
Sc & Let, Sr.
Morris D. E. Cincinnati, O.
Arts, Jr.
Morris R. T. New Haven, Ct.
Natural History, Soph.
Morrow C. E. New York City.
Mechanic Arts, Fr.
Morse E. R. Rutland, Vt.
Sc & Let, Jr.
Moses W. H. Malone
Sc & Let, Fr.
Mott D. W. Bangor
Optional, Fr.
Munson G. New York City
Architecture, Soph.

Ness J. Hooperston, Ill.
Sc & Let, Sr.
Newton W. T. Denver, Col.
Sc & Let, Jr.
Nixon C. E. Cincinnati, O.
Optional, Soph.
Northrop M. Woodhull
Optional, Fr.
Norton H. M. New York City
Agriculture, Soph.
Norton J. E. Belmont
Literature, Soph.

O'Brien M. J. Bergen
Sc & Let, Soph.
O'Connell J. R. Barrytown
Engineering, Jr.
Ogden C. E. Penn Yan
Optional, Fr.
Oliver M. E. Lynn, Mass.
Philosophy, Sr.
Olmsted A. S. Le Roy
Optional, Jr.
Olmsted C. Tarrytown
Sc & Let, Fr.
Olney W. Westernville
Engineering, Jr.
Ormsby F. W. Oswego
Engineering, Soph.
Ostrander W. S. Schuylerville
Optional, Fr.
Otis G. F. Boston, Mass.
Mechanic Arts, Soph.
Otis H. W. Sherwood
Optional, Fr.
Otis P. A. Leeds, Mass.
Mechanic Arts, Soph.
Outram T. S. Easton, Md.
Agriculture, Soph.

Page J. Stafford
Engineering, Jr.
Palmer E. A. Cortland
Mechanic Arts, Fr.
Palmer M. C. Sing Sing
Sc & Let, Fr.
Palmer N. A. Ithaca
Natural History, Soph.
Parke R. A. Binghamton
Mechanic Arts, Jr.
Parmelee R. M. Cleveland. O.
Optional, Fr.
Parmenter S. Cohocton
Science, Fr.
Parsons F. H. Montclair, N. J.
Agriculture, Soph.
Patten E. B. M. Binghamton
Literature, Jr.
Pattin W. B. Fort Plain
Sc & Let, Sr.
Peck L. R. West Bloomfield
Sc & Let, Jr.
Pennock C. J. Ithaca
Agriculture, Soph.
Phelps S. S. Morrisville
Literature, Soph.
Philipp W. B. Cincinnati, O.
Science, Jr.
Pierce C. E. Buffalo
Sc & Let, Jr.
Pierce H. Powling
Engineering, Soph.
Pierson C. B. Canandaigua
Sc & Let, Soph.
Place I. A. Alfred Centre
Optional, Fr.
Poole M. E. Smithboro
Arts, Soph.
Porter L. H. East Orange, N. J.
Sc & Let, Jr.
Prado B. de A. Itu, S. P., Brazil
Agriculture, Sr.
Preston E. L. Grinnell, Iowa
Engineering, Sr.
Putnam R. New York
Literature, Sr.

Queiroz-Telles A. neto S. Paulo, Brazil
Engineering, Sr.
Read J. E. Greenpoint
Engineering, Fr.
Reeve B. H. Mattituck
Optional, Soph.
Reeves A. M. Richmond. Ind.
Sc & Let, Sr.
Rexford C. M. Watertown
Arts, Sr.
Rhodes K. Trempealeau, Wis.
Optional, Fr.
Ribiero Q. N. Minos-Geraes, Brazil
Architecture, Sr.
Rich F. W. West Potsdam
Engineering, Fr.

Rites F. M. Chester
Mechanic Arts, Fr.
Roberts M. E. Ithaca
Philosophy, Soph.
Rodriguez F. V. Havana, Cuba
Engineering, Sr.
Roehrig F. L. Ithaca
Optional, Fr.
Rogers W. G. Ausable Forks
Optional, Fr.
Rose A. E. Cleveland, O.
Sc & Let, Soph.
Rudd W. N. Ithaca
Natural History, Soph.
Ruditsch P. Odessa, Russia
Agriculture, Soph.
Rundell F. P. De Kalb Junction
Optional, Fr.
Russel E. Ithaca.
Arts, Jr.
Russel S. J. Ithaca
Literature, Jr.
Russel W. C. Jr. Ithaca
Arts, Soph.
Ryder C. Carmel
Sc & Let, Soph.
Ryman F. S. Wilkesbarre, Pa.
Arts, Fr.

Salisbury H. L. Marcellus
Mechanic Arts, Fr.
Sanchez T. S. U. S. Colombia
Agriculture. Fr.
Sanger E. B. Rockville Centre
Natural History, Soph.
Schumm G. Sauk City, Wis.
Literature, Fr.
Scommon R. M. Stratham, N. H.
Sc & Let, Fr.
Seaman W. K. Newburgh
Mechanic Arts, Sr.
Sellers E. H. Fentonville, Mich.
Arts, Sr.
Severance F. H. Whitewater, Wis.
Sc & Let, Jr.
Seymour F. H. Lockport
Mechanic Arts, Fr.
Shackford, L. B. Ithaca
Literature, Soph.
Shippen H. Jamaica Plains, Mass.
Optional, Fr.
Shiras G. Pittsburgh, Pa.
Optional, Fr.
Schnable E. R. Chicago, Ill.
Engineering, Fr.
Simons S. A. Buffalo
Arts, Jr.
Simpson G. F. Lodi
Engineering, Jr.
Skinner F. W. Brownsville
Engineering, Jr.
Slauson A. B. Weedsport
Philosophy, Soph.
Smith A. W. Westmoreland
Mechanic Arts, Sr.
Smith C. D. Cambridge, Mass.
Arts, Soph.
Smith E. S. Canajoharie
Sc & Let, Fr.
Smith F. E. Scipio
Sc & Let, Jr.
Smith F. W. Ithaca
Arts, Soph.
Smith R. S. Cambridge, Mass.
Arts, Soph.
Smith T. Albany
Mathematics, Fr.
Smith W. Joseph Charleston
Engineering, Jr.
Smyth E. J. Owego
Optional, Fr.
Snyder H. W. Freeport, Ill.
Agriculture, Soph.
Sommers H. C. Ithaca
Arts, Fr.
Soule H. H. Syracuse
Optional, Soph.
Spaulding M. J. East Poultney, Vt.
Sc & Let, Jr.
Stambaugh H. H. Youngstown, O.
Sc & Let, Fr.
Stanton R. L. Tenafly, N. J.
Sc & Let, Soph.
Stearns J. B. Rouse's Point
Arts, Fr.
Storey W. Rochester
Engineering, Fr.
Studley D. South Byron
Sc & Let, Fr.
Suren N. H. Marash, Asia
Mechanic Arts, Jr.
Sweet C. L. Phœnix
Sc & Let, Soph.

Sweeting M. A. South Butler
Optional, Soph.
Sweeting W. H. South Butler
Sc & Let, Sr.

Taylor O. L. Freeport
Sc & Let, Fr.
Teague C. L. Caribou, Me.
Sc & Let, Fr.
Terry E. B. Waterville
Sc & Let, Soph.
Thatcher C. S. Hopewell
Engineering, Sr.
Thomas C. E. Waterloo
Agriculture, Fr.
Thomas F. S. Bay Ridge
Sc & Let, Soph.
Thompson E. W. Smithville, Ga.
Mechanic Arts, Fr.
Tibiriça J. P. S. Paulo, Brazil
Mechanic Arts, Sr.
Tidball J. S. Fort Monroe, Va.
Sc & Let, Soph.
Tidball W. C. Fort Monroe, Va.
Chem & Phys, Jr.
Tiffany F. G. Gainsville
Sc & Let, Soph.
Tilton J. N. Rome, Italy
Architecture, Soph.
Tilton P. H. Rome, Italy
Mechanic Arts, Soph.
Tomkins C. Newark, N. J.
Sc & Let, Jr.
Tompkins M. Ithaca
Sc & Let, Fr.
Tracy A. M. Ghent
Sc & Let, Soph.
Trelease W. Brooklyn
Natural History, Soph.
Treman R. H. Ithaca
Mechanic Arts, Sr.
Trumbull T. H. Washington, D. C.
Optional, Jr.
Trump E. N. Wilmington, Del.
Mechanic Arts, Soph.
Turner S. B. Ithaca
Literature, Soph.
Tyson F. C. Chicago, Ill.
Engineering, Fr.

Underhill I. M. Norwalk, O.
Sc. & Let, Soph.
Upjohn R. R. Brooklyn
Engineering, Soph.
Upton C. O. Clymer
Agriculture, Fr.

Vail A. T. Chester
Sc & Let, Soph.
Vance L. J. Penn Yan
Sc & Let, Soph.
Van Duzer W. Horseheads
Arts, Fr.
Van Norman H. J. Jasper
Sc & Let, Sr.
Van Wormer E. E. Glennville
Sc & Let, Jr.
Vasconcellos A. C. de
Rio Janeiro, Brazil
Mechanic Arts, Sr.
Vaughn E. G. Richmond, Ind.
Sc & Let, Fr.

Wagner C. G. Whitesboro
Natural History, Soph.
Wakeley A. C. Omaha, Neb.
Literature, Sr.
Walters W. A. Phoenix
Architecture, Fr.
Warner J. W. Rock Stream
Sc & Let, Jr.
Washburne A. Chappaqua
Sc & Let, Jr.
Waterbury H. T. Rensselaerville
Mechanic Arts, Fr.
Waterbury J. C. Rensselaerville
Mechanic Arts, Soph.
Watson G. C. Clyde
Agriculture, Fr.
Webster H. Oyster Bay
Science, Soph.
Weed A. North Rose
Engineering, Jr.
Weed M. E. North Rose
Literature, Jr.
Weed W. North Rose
Sc & Let, Sr.
Weinmann J. H. St Johnsville
Sc & Let, Jr.
Welker P. A. Toledo, O.
Engineering, Sr.
Wells G. M. Elmira
Sc & Let, Jr.

Wendell H. T. Chicago, Ill.
Architecture, Fr.
Weston A. T. Salem
Optional, Fr.
White S. West Township
Optional, Fr.
Whitney F. C West Danby
Arts, Soph.
Whiton F. J. Ithaca
Arts, Jr.
Wick R. B. Pittsburgh, Pa.
Mechanic Arts, Fr.
Wightman W. H. Hastings
Engineering, Fr.
Wilcox F. N. Ithaca
Architecture, Jr.
Wilcox N. Ithaca
Literature, Soph.
Wilcox W. J. Ithaca
Mechanic Arts, Sr.
Wilhelm H. W. Toledo, O.
Engineering, Soph.
Williams H. K. Dunkirk
Chemistry, Soph.
Wilson F. M. Ithaca
Optional, Sr.
Wing A. J. Albany
Science, Soph.
Wing H. H. Willow Brook
Agriculture, Fr.
Wise O. S. New York City
Sc & Let, Soph.
Withington A. B. South Amboy
Literature, Fr.
Woodward J. H. Brandon, Vt.
Sc & Let, Jr.
Woolworth A. M. Turin
Sc & Let, Soph.
Wright F. A. Newburgh
Architecture, Jr.

Young J. H. W. Cold Spring
Natural History, Jr.

RULES FOR THE GUIDANCE OF STUDENTS,

SEPTEMBER, 1877.

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§ 1. At the beginning of each term each student must obtain a certificate of registration before joining any class or attending any lectures.

§ 2. No student, after having once been admitted to the University, will be allowed to register after the close of REGISTRATION DAY, except by special permission of the Faculty, granted on the presentation of a satisfactory excuse for his delay.

§ 3. No student will be allowed to join any class, unless he enters his name with the Professor in charge of it immediately after his registration.

§ 4. Students in Regular Courses must take the studies of their course term by term. Optional students, unless otherwise allowed by the Faculty, must attend not less than fifteen recitations per week, or their equivalent in other University exercises, in addition to Military Drill or its substitute. And no student shall enter examinations on more than twenty hours per week of University work, including Drill or the substitute for it, except as provided in § 16 below.

No credit will be given for examinations in excess of those allowed by the Rules of the Faculty; and in case more are reported by the Professors, the number will be reduced by striking from the Reports all examinations that were not registered for, at the time of obtaining the registration ticket.

§ 5. Each student not in any one of the Regular Courses laid down in the Register, must, on his application for his Registration Ticket, furnish the Registrar with a list of the studies he intends to take; it must receive the approval of the Faculty; and no change can be made during the term in the studies thus registered.

§ 6. Instruction in Military Science and Drill is required of all students in the University during the first and third terms of the first, second and third years, and during the second term of the fourth year.

§ 7. Students may, however, substitute other University work for the Drill and Military Science of whatever term on the following conditions:

The substitute must be equal to two recitations per week, and examinations must be passed in it the same as in any other University work;

It may not be anything in which the student offering it has previously failed to pass his examination or in which he is at the time conditioned; nor, (in case he is in any one of the regular courses) anything that is required in his course for the term in which it is offered as a substitute;

It must be (1) some science, (either recitations, lectures or laboratory work,) (2) some foreign language, or (3) (for those students who are in courses requiring such work,) it may be extra draughting or shop work.

If any student who is excused from Drill or its substitute, either as a laboring student or on account of physical disability, shall take more than fifteen hours of recitations per week or the number required in his course, his excuse will be considered as anulled.

§ 8. The substitute that is offered must be specified to the Registrar at the time of registration, and, if accepted, it will be entered by him on his Registration Book. But if no substitute is thus offered and accepted, the student will be holden to the Drill or Military Science for the term, whatever may be the number of hours of University work he may have.

§ 9. No change in the work thus accepted as a substitute for the Drill or Military Science can be made during any term unless it is done, and the registration modified accordingly, within one week after obtaining the registration ticket.

§ 10. All students that drill after the first term of their first year will be required to procure the uniform prescribed by the University and wear it on all occasions of Drill and Parade.

§ 11. Tuition must be paid at the beginning of each term; and if any student fails to pay his dues to the University or to make a satisfactory arrangement in regard to them, within the time prescribed by the Treasurer, his name will, on the report of that officer to the Faculty, be struck from the rolls of his classes.

§ 12. Students who are conditioned on their entrance examinations will be required to make up their condition at such time, *before the close of the third term*, as the Professor in charge of the department may require: and no student will be allowed to register for the first term of the second year whose conditions at his entrance examinations have not been removed.

§ 13. No student who fails to pass his examinations at the close of any term so as to get the standard required for graduation, will be allowed to take more than fifteen hours of recitations and lectures for the following term, except those required as a substitute for Drill.

§ 14. Every student who shall be conditioned for failure at any examination must remove the condition, either by passing

such examination of conditioned students as may be appointed for the first week of the next academic year after the failure, or by passing an examination in class the next time after such failure that any class shall be examined in the study in which he is conditioned.

If the student fail to remove the condition at one of the examinations above specified, he shall not be admitted to any subsequent examination in that study unless he shall have taken it over again in class.

Any Professor of a department may exclude from his class any student who shall have been conditioned in a study required in that department, and who, after having had an opportunity to do so, shall not have removed the condition.

§ 15. No optional student will be allowed to register for or pursue any two subjects that come at the same hour so as to conflict with each other.

§ 16. No student who has not regularly attended the lectures, recitations, etc., in any subject will be allowed to enter the examination in that subject except either to make up a condition, or to pass an examination in some subject that he has pursued elsewhere: and in this latter case the examinations must be passed at the first term-examination in the subjects, after the student's admission to the University.

§ 17. No student will be admitted to examination at the end of the term whose absences shall not have been excused by the Professor of the department in which they have occurred, or by the Faculty.

§ 18. Students in regular courses taking studies belonging to different years in the same course will be required to attend the instruction in the study belonging to the year for which

they registered at the beginning of the term; and in case of any conflict of hours at the time of examination, each student must attend the examination in the study of the year for which he registered, in preference to any other.

§ 19. Any student having occasion to be absent from the University must obtain permission from the President or Vice-President, or, in case the absence is to extend over the term examinations, from the Faculty.

§ 20. No student will receive leave of absence other than temporary, or dismissal from the University, unless all dues have been paid, and his standing at the time be such as to allow him to continue with his classes.

§ 21. Any student having obtained leave of absence must leave town within twenty-four hours, or it will be considered as annulled.

§ 22. Any student absenting himself from University duties for more than three consecutive days without leave, will be regarded as having withdrawn from the University, and will not be permitted to rejoin his classes without the consent of the Faculty.

§ 23. A student whose term examinations show that his average proficiency is not satisfactory, will be considered as having thereby dropped from his classes, and will not be permitted to register again except by vote of the Faculty, for special reasons, until the following year, at the beginning of the term corresponding to that in which the failure occurred.

§ 24. If, after this, he again fails to pass his examinations, he may be readmitted by vote of the Faculty, but only on condition that he confine himself strictly to some one of the regular courses, repeating all the studies in the course selected, in

which he has not passed satisfactory examinations, and following the course as far as possible in the order in which the studies are laid down in the Register. By failure to comply with these conditions the student forfeits his privilege of readmission.

§ 25. Any student who has fallen from his classes, or who for any reason has ceased to attend to his University duties, or whose parents have been requested to remove him, must, under penalty of expulsion, unless a resident of Ithaca, leave town within five days after notice of his having fallen out shall have been given him by mailing in the post-office at Ithaca.

§ 26. If a student is detected in any fraud in examination, the examination will be regarded as void, and the offender will be suspended from the University.

§ 27. Students found guilty of intoxication, gambling or other gross immorality, or of hazing in any form, will be removed from the University.

§ 28. No student is permitted, except for purposes of military drill, to use fire arms in the University buildings, or on the University grounds within half a mile of the buildings.

§ 29. Announcements by the Faculty to the students in general will be considered as duly promulgated after having been posted on the bulletin board, and notices to students which shall be deposited in the post-office, will after twenty-four hours be considered as delivered.

§ 30. All communications from students intended for the Faculty should be deposited in the Letter-Box placed on the door at the entrance to the Faculty Room for that purpose before two o'clock on Friday of each week.

CORNELL UNIVERSITY.

FALL TERM, 1877-8.

CALENDAR.

TUESDAY, September 18,	Entrance Examinations.
WEDNESDAY, September 19,	Entrance Examinations contin'd
THURSDAY, September 20,	REGISTRATION for the Term.
FRIDAY, September 21,	Instruction begins.
THURSDAY and FRIDAY, } Nov.	THANKSGIVING.
MONDAY, December 17,	Term Examinations begin.
FRIDAY, December 21,	Term ends.

WINTER TERM.

TUESDAY, January 8,	Entrance Examinations.
WEDNESDAY, January 9,	Entrance Examinations cont'd.
THURSDAY, January 10,	REGISTRATION for the Term.
FRIDAY, January 11,	Instruction begins.

OFFICE HOURS.

VICE-PRESIDENT, Daily 12–1.
TREASURER, Daily 9 a. m. to 3 p. m.
REGISTRAR, Mondays, Wednesdays, and Fridays, 12 to 1.15 p. m.; Tuesdays and Thursdays, 11 to 1.15 p. m.; Fridays, 2.30 to 4 p. m.
LIBRARIAN, Daily 2 to 5 p. m.
LIBRARY and Reading Room, Open daily 8 a. m. to 5 p. m.

FACULTY MEETINGS, Friday of each week 4 p. m.
UNIVERSITY SERMONS at Sage Chapel, Sunday at 11 a. m. and 3 p. m.

C. B. MANDEVILLE, *Janitor*, 26 South University.

STUDENTS' DIRECTORY.

SOUTH UNIVERSITY BUILDING:

South Hall.—Offices of the Vice-President, the Treasurer, and the Registrar. Physical Laboratory up stairs. Armory, room 28.

Middle Hall.—Faculty-room, Agricultural Museum, and Lecture-rooms E, F, G, H, I and K.

North Hall.—Ladies' Room (No. 3), Recitation rooms 1, 2, 4, 5 and 7.

MCGRAW BUILDING:

South Entrance.—The Library: the Physical Lecture-room. The Geological Laboratory up stairs.

Middle Entrance.—The Museums of Paleontology, Geology, Mineralogy, Ornithology, Conchology, and Comparative Zoölogy.

North Entrance.—The Architectural Rooms, and the Anatomical Lecture-room.

NORTH UNIVERSITY BUILDING:

South Hall.—Recitation-rooms 49, 50 and 52.

Middle Hall.—Societies' Room (M,) Lecture-rooms N, O, P, Q, R, S and T.

North Hall.—Recitation-rooms 33, 34, 35 and 36.

SIBLEY COLLEGE:

Printing Office, Mechanical Laboratory and Mechanical Lecture-rooms. Draughting-rooms for Free-hand and Mechanical Draughting.

CHEMICAL BUILDING:

North Wing.—Rooms of the Department of Civil Engineering.

South Wing.—Chemical and Mineralogical Laboratories, and Lecture-rooms for General and for Agricultural Chemistry.

SAGE COLLEGE:

Southwest Entrance.—Botanical Lecture-rooms, Museums and Laboratories.

INDEX OF INSTRUCTORS.

PRESIDENT ANDREW D. WHITE, LL.D. [Absent in Europe. Lectures read by Professor Shackford, T. Th., 11].

ANTHONY, Professor William A., (I) *Heat.* (II) *Laboratory Practice*, Daily 8–5.

BABCOCK, Professor Charles, (I) *Egyptian, Greek and Roman Architecture*, T. W. Th., 9. (II) *Renaissance*, W. Th. F., 10. (III) *Mechanics*, M. W. F., 12. (IV) *Designing*, M. T., 10. *Draughting*, Daily, 8–5.

BOYESEN, Professor H. H., (I) *German*, (Wilhelm Tell), M. W. F., 9, 10. (II) *German Literature*, T. Th., 9.

BRENEMAN, Assistant Professor A. A., (I) *Chemical Philosophy*, M. W. F., 11. (II) *Chemical Laboratory Practice*, Daily 8–5.

BURBANK, Professor James S., *Military Tactics*, M. W. F., 4 p. m.

CALDWELL, Professor George C., (I) *Agricultural Chemistry*, Daily, 9. (II) *Advanced Organic Chemistry*, Tuesday, 3 p. m. (III) *Chemical Laboratory Practice*, Daily 8–5.

CHURCH, Assistant Professor Irving P., (I) *Analytical Mechanics*, Daily 10, 11. (II) *Stereotomy*, M. W. F., 8–10.

CLEAVES, Assistant Professor Edwin C., *Free-hand Drawing*, Daily 10–4.

COMSTOCK, Assistant Professor J. Henry, *Entomology*, Daily 8–5.

COMSTOCK, Assistant Professor Theodore B., *Geology*, *Laboratory Practice*, Daily 8–5.

COON, Instructor John S., (I) *Machine Construction*, Daily 8–12. (II) *Mechanism and Machine Drawing*, Daily 8–1.

CORSON, Professor Hiram, (I) *Anglo-Saxon*, M. W. F., 19. (II) *English Literature*, T., 10. (III) *Special Classes* (Juniors), M. W., 9; (Seniors), T. Th., 9.

CRANDALL, Assistant Professor Charles L., (I) *Descriptive Geometry*, M. T. W. Th., 8. 9. (II) *Descriptive Draughting*, M. W. F., 10–1. (III) *Shades, Shadows and Perspective*, T. Th. F., 10–12.

CRANE, Professor T. Fred, (I) *French*, (Corneille, the *Cid*), M. W. F., 8. 9. 10. (II) *Italian*, beginning, T. Th., 8; *advanced*, T., 10. (III) *Spanish*, beginning, T. Th., 9; *advanced*, Th., 10.

DUDLEY, Assistant Professor William R., (I) *Vasculor Cryptogamia.* (II) *Laboratory Work*, Daily 8–5.

DWIGHT, Professor Theodore W., (Non-Resident.)
No Lectures this Term.

FISKE, Professor Willard, (I) *German* (Wilhelm Tell), M. W. F., 10. (II) *German*.(Goethe's Egmont), T. Th., 9. (III) *Swedish*, M. W. F., 11.

FLAGG, Professor Isaac, (I) *Thucydides* (Narative Portions), M. T. Th., 10. (II) *Thucydides*, Books, I, II, M. T. Th., 9. (III) *Greek Composition*, F., 9, 10.

FUERTES, Professor Estévan A., (I) *Spherical* and *Practical Astronomy*, Daily 10. (II) *Civil Engineering*, T. Th., 9. (III) *Topographical Mapping*, M. W., 11–1. (IV) *Special Work*, 8–12.

HARTT, Professor Chas. Fred. [Absent in Brazil.]
No Lectures this Term.

HEWETT, Assistant Professor Waterman T. [Absent in Europe.]

JONES, Assistant Professor George W., *Algebra*, Daily 8, 9, 10.

KENT, Instructor W. H., *Chemical Laboratory Practice*, Daily 8–5.

LAW, Professor James, *Veterinary Anatomy* and *Physiology*, Daily, 8.

LAZENBY, Instructor William R., (I) *Fruit Culture* and *Market Gardening*, T. Th., 9. (II) *Garden Work*, Daily 7–6.

LOWELL, Professor James Russell, (Non-Resident.)
No Lectures this Term.

LUCAS, Instructor William E., *Rhetoric and Composition.*

MACKOON, Professor Bela P., *German*, Daily 9, 10, 11.

MOLER, Instructor George S., *Physics*, *Laboratory Practice*, Daily 8–5.

MORRIS, Professor John L., (I) *Machine Construction*, Daily 8–12. (II) *Mechanism* and *Machine Drawing*, Daily 8–1

OLIVER, Professor James Edward, (I) *Calculus*, Daily 8. (II) *Analytical Geometry*, Daily 9, 10. (III) *Higher Mathematics*, Daily 11.

PECK, Professor Tracy, (I) *Tacitus* (Annals), and *Catullus*, M. T. W. Th., 8. (II) *Livy*, Books V and XXII, M. T. W. Th., 9, 10.

POTTER, Assistant Professor Ziba H., (I) *Algebra*, Daily 8, 9. (II) *Analytical Geometry*, Daily 10.

PRENTISS, Professor Albert N., (I) *Lectures* and *Laboratory Work on Fungi*. (II) *Lectures on the Principles of Horticulture and Landscape Gardening*, W. F., 9. (III) *Six Lectures on Compositae, with general Laboratory Work*, Daily 8–5.

ROBERTS, Professor Isaac P., (I) *Agriculture*, Daily 10. (II) *Farm Work*, Daily 8–6.

SHACKFORD, Professor Charles Chauncy, (I) *Rhetoric and Composition*, T. Th., 12. (II) *Essays and Criticisms*, Th., 10. (III) *General Literature and Oratory*, M. W. F., 10.

RŒHRIG, Professor Frederick L. O., (I) *French* (Otto's Grammar), Daily 9, 10. (II) *Arabic*, beginning, T. 11; *advanced*, Th., 11. (III) *Sanscrit*, W. F., 11. (IV) *Turkish*, M., 11.

RUSSEL, Professor William C., (I) *Roman History*, Daily 11. (II) *American History*, M. W. F., 9. (III) *Modern French Literature*, T. Th., 10.

SCHAEFFER, Professor Charles A., *General Organic Chemistry*, M. W., 12; (Laboratory Practice), Daily 8–5.

SMITH, Instructor B. Hermon, *Typography* (Printing Office), 8–6.

SMITH, Professor Goldwin, (Non-Resident.)
No Lectures this Term.

STEBBINS, Assistant Professor Alfred, *French* (Otto's Grammar), Daily 9, 10, 11.

STEWART, Professor Elliott W., (Non-Resident).
No Lectures this term.

SWEET, Director John E., *Practical Mechanics*, (Mechanical Laboratory), Daily 8–6.

TAYLOR, Professor Bayard, (Non-Resident.)
No Lectures this Term.

WAIT, Professor Lucien A., (I) *Integral Calculus*, Daily 8. (II) *Algebra*, Daily 9, 10.

WHITE, Assistant Professor Horatio S., (I) *Plato's Apology*, M. T. Th. F., 11. (II) *Horace*, (Satires and Epistles), M. T. W. Th., 10.

WILDER, Professor Burt G., (I) *Human Physiology*, M. W. F., 11. (II) *Hygiene*, six lectures beginning Monday, Sept. 24, 12. (III) *Comparative Anatomy*, (Laboratory Practice), Daily 8–6.

WILSON, Professor William D., (I) *Psychology*, T. Th., 9. (II) *History of Philosophy*, M. W. F., 11.

WING, Professor Charles H., (Non-Resident.)
No Lectures this Term.

SCHEDULE OF SUBJECTS, HOURS AND ROOMS OF EXERCISES.

First Year, or Freshman Studies.

SUBJECT.	SECTIONS.		HOURS.	ROOM.	DAYS.	PROFESSOR.
ALGEBRA,	Sci., Lit., Phil.	1	8.00	35	Daily.	Potter.
"	and Cl.	2	9.00	35	"	"
"		3	8.00	36	"	Jones.
"		4	9.00	36	"	"
"		5	10.00	36	"	"
"	Arch., Eng. and	1	9.00	33	"	Wait.
"	Mech. Arts.	2	10.00	33	"	"
FRENCH,	Sec. 1		9.00	O	Daily.	Rœhrig.
"	" 2		9.00	P	"	Stebbins.
"	" 3		10.00	O	"	Rœhrig.
"	" 4		10.00	P	"	Stebbins.
"	" 5		11.00	P	"	"
GERMAN,	Sec. 1		9.00	E	Daily.	MacKoon.
"	" 2		10.00	E	"	"
"	" 3		11.00	E	"	"

Second Year, or Sophomore Studies.

SUBJECT.	SECTIONS.	HOURS.	ROOM.	DAYS.	PROFESSOR.
GERMAN (*Advanced*),	Sec. 1	9.00	5	M. W. F.	Boyesen.
"	" 2	10.00	7	"	Fiske.
"	" 3	10.00	5	"	Boyesen.
FRENCH (*Advanced*),	Sec. 1	8.00	52	M. W. F.	Crane.
"	" 2	9.00	52	"	"
"	" 3	10.00	52	"	"
ORGANIC CHEMISTRY,	Class.	12.00	Ch. L. R.	M. W.	Schaeffer.
Laboratory Practice,	Chem., Phys. & Opt.	9—5	Chem. Lab.	Daily.	Caldwell & Kent.
PHYSICS, *Heat*,	Class.	12.00	Phys. L. R.	T. Th.	Anthony.
ANAL. GEOMETRY,	Arch., Chem., Sci. & Optional.	10.00	35	Daily.	Potter.
RHETOR. EXERCISES.	Sec. 1	11.00	S	Monday.	Shackford.
"	" 2	11.00	S	Wednesday.	"
"	" 3	11.00	S	Friday.	"

Third Year, or Junior Studies.

SUBJECT.	SECTIONS.	HOURS.	ROOM.	DAYS.	PROFESSOR.
Roman History,	Class.	11.00	T	Daily.	Russel.
Psychology,	Class.	9.00	K	T. Th.	Wilson.
Physics, *Heat*,	Class.	12.00	Phys. L. R.	T. Th.	Anthony.
Rhetoric and Essays,	Class.	10.00	S	Thursday.	Shackford.
Eng. Literature,	Class.	10.00	I	Tuesday.	Corson.
Special Literature,	Literature.	9.00	I	M. W.	Corson.
Veterinary Science,	Agr. and Nat. Hist.	8.00	N	Daily.	Law.
Mechanics,	Architecture.	12.00	Arch. L. R.	M. W. F.	Babcock.
Architecture,	Architecture.	9.00	Arch. L. R.	T. W. Th.	Babcock.
Draughting.	"	8—5	Arch. D. R.	Daily.	Wright.

Junior Studies Continued.

ARABIC, *Beginning.*	Optional.	11.00	O	Tuesday.	Rœhrig.
FRENCH,	Optional.	10.00	50	T. Th.	Russel.
GREEK.	Optional.	9.00	G	M. T. Th. F.	Flagg.
ITALIAN,	Optional.	8.00	52	T. Th.	Crane.
LATIN,	Optional.	8.00	1	M. T. W. Th.	Peck.
MINERALOGY, *Blowpipe Analysis, Laboratory Practice.*	Optional.	—	Chem. Lab.	Daily.	Schaeffer and Jennings.
SPANISH,	Optional.	9.00	52	T. Th.	Crane.
SWEDISH,	Optional.	10.00	7	M. W. F.	Fiske.

Fourth Year, or Senior Studies.

SUBJECT.	SECTIONS.	HOURS.	ROOM.	DAYS.	PROFESSOR.
MODERN HISTORY,	Class.	11.00	S	T. Th.	Pres. White.
AMERICAN HISTORY,	Sec. 1	9.00	50	Monday.	Russel.
"	" 2	9.00	50	"	"
"	" 3	9.00	50	Friday.	"
HIST. OF PHILOSOPHY,	Class.	11.00	K	M. W. F.	Wilson.
LIT. & ORATORY,	Class.	10.00	S	M. W. F.	Shackford.
SPECIAL LITERATURE,	Literature.	9.00	I	T. Th.	Corson.
AGRICULTURE,	Agricultural.	10.00	4	Daily.	Roberts.
Farm Work,	"	8—6	—	"	"
PRACT. HORTICULTURE,	Agricultural.	9.00	4	T. Th.	Lazenby.
RENAISSANCE,	Architectural.	11.00	Arch. L. R.	Daily.	Babcock.
Draughting,	"	8—5	Arch. D. R.	Daily.	Wright.
ORGANIC CHEM. *Adv.*,	Ch. & Phys.	3 p. m.	Ch. B. 3.	Tuesday.	Caldwell.
Laboratory Practice,	Ch., Phys. & Opt.	8—5	Chem. Lab.	Daily.	Caldwell and Breneman.

Senior Studies Continued.

Physics, *Lab. Practice*,	Chem. and Physics.	8—5	Phys. Lab.	Daily.	Anthony.
Spher. Astronomy,	Engineering.	10.00	Eng. L. R.	Daily.	Fuertes.
Analyt. Mechanics,	Engineering. 1	11.00	Eng. R. R.	Daily.	Church.
"	" 2	12.00	"	"	"
Stereotomy,	Engineering.	8—10	Eng. D. R.	M. W. F.	Church.
Civil Engineering,	Engineering.	9.00	Eng. L. R.	T. Th.	Fuertes.
Special Work,	"	8—12	"	"	"
Special Mathematics,	Mathematics.	11.00	34	Daily.	Oliver.
Mechanism,	Mechanic Arts.	9.00	3 Sibley.	Daily.	Morris.
Machine Drawing,	Mechanic Arts.	8—1	3 Sibley.	Daily.	Morris & Coon.
———	Mechanic Arts.	10 00	—	—	Morris.
Shop Practice,	Mechanic Arts.	2 hours.	Mech. Lab.	Daily.	Sweet.
Fungi,	Nat. His. & Agr.	8—5	Bot. Lab.	Daily.	Prentiss
Horticulture and Landscape Gard'ng,	Nat. His. & Agr.	9.00	Bot. L. R.	W. F.	Prentiss
Geology, *Lab. Work*,	Natural History.	8—5	Geol. Lab.	Daily.	Comstock.

ARABIC,	Optional.	11.00	O	Thursday.	Rœhrig.
FRENCH,	Optional.	10.00	50	T. Th.	Russel.
GERMAN, (*Nathan der Weise*),	Optional.	9.00	7	T. Th.	Fiske.
GER. LITERATURE,	Optional.	9.00	5	T. Th.	Boyesen.
GREEK,	Optional.	9.00	G	M. T. Th. F.	Flagg.
HEBREW,	Optional.	10.00	K	Daily.	Wilson.
ITALIAN, (*Advanced*),	Optional.	10.00	52	Tuesday.	Crane.
LATIN,	Optional.	8.00	1	M. T. W. Th.	Peck.
RHETOR. EXERCISES,	Optional.	9.00	R	Friday.	Shackford.
SPANISH, (*Advanced*),	Optional.	10.00	52	Thursday.	Crane.
SANSCRIT,	Optional.	11.00	O	W. F.	Rœhrig.
TURKISH,	Optional.	11.00	O	Monday.	Rœhrig.

TERM EXAMINATIONS.

The following appointment of rooms and hours for examinations has been made for the eud of the present term, beginning on Monday, December 17, at 8 a.m. and ending on Friday, December 21, at 1.30 p.m. The morning examinations will begin at 8 a.m. and continue until 11 a.m. The afternoon examinations will begin at 2.30 p.m.

DAY.		SUBJECT.	CLASS.	ROOMS.
Monday	p. m.	French	Freshmen	T
Tuesday	a. m.	Physics	Sophomores	T
	p. m.	Algebra	Freshmen	T
Wednesday	a. m.	German	Sophomores	K
	p. m.	Roman Hist.	Juniors	T
Thursday	a. m.	German	Juniors	K
	p. m.	French	Sophomores	T
Friday	a. m.	Physics	Juniors	T

All of the classes will be examined at the close of the term ; examinations beginning Monday, Dec. 17, and ending Friday 1½ p. m. The examinations in the subjects named in the table above have been appointed by the Faculty and will not be changed, the others will be arranged by the seveal Professors and duly notified to the classes before the end of the term.

THE

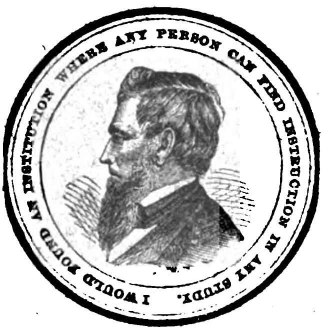
CORNELL

University Register

AND CATALOGUE

1878-79

FIRST EDITION



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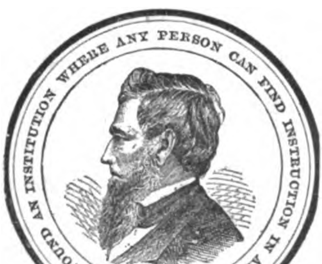

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ADMISSION AND GRADUATION.

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THE CALENDAR.

1878	Sept. 17	**Fall Term.**
September 17	Tuesday	Entrance Examinations.
September 18	Wednesday	Entrance Examinations continued.
September 19	Thursday	REGISTRATION for the Term.
September 20	Friday	Instruction begins.
November	Thursday and Friday	THANKSGIVING.
December 16	Monday	Term Examinations begin.
December 20	Friday	Term ends.
1879	Jan. 7	**Winter Term.**
January 7	Tuesday	Entrance Examinations.
January 8	Wednesday	Entrance Examinations continued.
January 9	Thursday	REGISTRATION for the Term.
January 10	Friday	Instruction begins.
January 11	Saturday	FOUNDER'S DAY.
February 22	Saturday	WASHINGTON'S BIRTHDAY.
March 24	Monday	Term Examinations begin.
March 28	Friday	Term ends.

1879		April 5	Spring Term.
April	5	Saturday	REGISTRATION for the term.
April	7	Monday	Instruction begins.
May	2	Friday	Woodford Prize Competition.
May	19	Monday	Commencement Essays handed in.
May	30	Friday	DECORATION DAY.
June	2	Monday	Senior Examinations begin.
June	3	Tuesday	Examinations for Second Degrees.
June	9	Monday	Term Examinations begin.
June	14	Saturday	Term Examinations end.
June	16	Monday	Entrance Examinations begin.
June	17	Tuesday	Class Day.
June	18	Wednesday	Alumni Day. Annual Meeting of the Trustees.
June	19	Thursday	ANNUAL COMMENCEMENT.
1879		Sept. 16	Fall Term.
September	16	Tuesday	Entrance Examinations.
September	17	Wednesday	Entrance Examinations continued.
September	18	Thursday	REGISTRATION for the term.
September	19	Friday	Instruction begins.

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Bailey, Henry,	Caughdenoy,	*Science and Letters*
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Benchley, Paul Zeno,	Ithaca,	*Agriculture*
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Borden, Thomas Paschal,	Denver, Col.,	*Engineering*
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Chandler, Walter,	Weldon, Ill.,	*Science and Letters*
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Dounce, George Alexander,	Elmira,	*Arts*
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Ferguson, Nicholas Ephraim,	New Milford,	*Engineering*
Fleischman, Adolph,	Albany,	*Architecture*
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Fleming, Minnie Miranda,	Ithaca,	*Literature*
Gelatt, Roland Bernard,	Keokuk, Iowa,	*Literature*
Gibson, Stanford Jay,	South New Berlin,	*Science*
Gifford, Harold,	Milwaukee, Wis.,	*Science and Letters*
Green, Hattie Lucina,	South Byron,	*Science and Letters*
Haight, James Augustus,	Oshkosh, Wis.,	*Arts*
Hamilton, John Foster,	New York City,	*Optional*
Haskell, Eugene Elwin,	Forestville,	*Engineering*
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Hostetler, Virgil Newland,	Decatur, Ill.,	*Science and Letters*
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Spaulding, Moses Jay,	East Poultney, Vt.,	*Science and Letters*
Tibiriçá, José Piratininza,	S. Paulo, Brazil,	*Mechanic Arts*

Tomkins, Calvin,	Newark, N. J.,	*Science and Letters*
Warner, James Ward,	Rock Stream,	*Science and Letters*
Washburn, Alfred,	Chappaqua,	*Science and Letters*
Weed, Addison,	North Rose,	*Engineering*
Weed, Mary Elizabeth,	North Rose,	*Literature*
Weinmann, John Henry,	St Johnsville,	*Science and Letters*
Welles, George Matson,	Elmira,	*Science and Letters*
Woodward, Julius Hayden,	Brandon, Vt.,	*Science and Letters*
Wright, Frank Ayres,	Newburgh,	*Architecture*
Young, John Henry Weir,	Cold Spring,	*Natural History*

IN THE THIRD YEAR OR JUNIOR STUDIES.

Adams, Edward Shields,	Chicago, Ill.,	*Optional*
Allison, Charles Rollo,	Oswego,	*Optional*
Arnold, George,	Rochester,	*Science and Letters*
Arrigunaga de, Joaquin Gutierez,	Campeche, Mexico,	*Agriculture*
Atwood, Charles Edwin,	Ithaca,	*Science and Letters*
Baker, William Apollos,	Yaphank,	*Science and Letters*
Beckwith, John Dorr,	Cedarville,	*Science and Letters*
Bird, William Noble Davis,	Ithaca,	*Agriculture*
Bissell, Esse Clarissa,	South Bend, Ind.,	*Science and Letters*
Bliss, Henry Dwight,	Holley,	*Agriculture*
Boyer, Arthur Grindage,	Aurora,	*Agriculture, Opt.*
Bronk, William,	New Baltimore,	*Arts, Opt.*
Buck, Helen Albertian,	Watkins,	*Science and Letters*
Carpenter, Charles Raymond,	Leavenworth, Kan.,	*Natural History*
Carpenter, George,	Utica,	*Natural History, Opt.*
Carrier, William Harvey,	Phœnix,	*Agriculture*
Chevelier, Josephine,	New York,	*Chemistry, Special*
Clements, Gabrielle Devaux,	Philadelphia, Pa.,	*Science and Letters*
Cobb, Fred. Carlton,	Andover.	*Philosophy*
Cook, Charles Button,	Buffalo,	*Architecture*
Cramphin, Harry Alexander,	Morrisville,	*Science and Letters*
Curtis, Frank Smith,	Moravia,	*Science and Letters*

Curtiss, Edward Whitehead,	Whitewater, Wis.,	*Mechanic Arts*
Eastman, Adelbert Lyon,	Arcade,	*Optional*
Ewing, Addison Luther,	La Grange, Wis.,	*Science and Letters*
Ferris, George Ferris,	Philadelphia, Pa.,	*Engineering*
Finch, William Albert,	Ithaca,	*Arts*
Fishel, Frederic Eugene,	Patchogue,	*Literature, Opt.*
Force, Lafayette,	Tekama, Neb.,	*Science and Letters*
Fox, Walter Howard,	Portland, Me.,	*Agriculture*
Gardner, William,	Syracuse,	*Science and Letters*
Gifford, George Francis,	Jamestown,	*Science and Letters*
Goodwin, DeWitt,	Dresserville,	*Science and Letters*
Graves, Spencer Coleman,	Chilesburg, Ky.,	*Optional*
Green, Robert Packer,	Media, Pa.,	*Engineering*
Gregory, Emily Lovira,	Buffalo,	*Literature*
Gregory, Edgar Warren,	Palmyra,	*Science and Letters*
Halpen, Annie Marie,	Albany,	*Science and Letters*
Hamilton, Justus Albert,	Ottumwa, Ia.,	*Science*
Havens, Rodman Wesley,	Ellenburgh,	*Engineering*
Hayes, Rutherford Platt,	Fremont, O.,	*Science and Letters*
Henry, William Arnon,	Defiance, O.,	*Agriculture*
Hills, Harold Edwards,	Auburn,	*Science and Letters*
Humphrey, Charles,	Ithaca,	*Science and Letters*
Huntley, Willis Arnold,	Troy,	*Literature*
Irvine, Frank,	Sharon, Pa.,	*Science and Letters*
Johnson, Charles Haldam,	New York City,	*Arts, Opt.*
Jonas, Albert,	Buffalo,	*Optional*
Jones, Frank Henry,	Trumansburg,	*Agriculture, Opt.*
Kelley, Irving Washington,	Kelley's Island, O.,	*Engineering*
Kelley, William Datus,	Kelley's Island, O.,	*Engineering*
Kidder, Frank Eugene,	Bangor, Me.,	*Architecture, Opt.*
Knapp, James Louis,	Union,	*Science and Letters*
Landon, Eugene Ashbel,	Vineland, N. J.,	*Engineering*
Lathrop, Oscar Garland,	Ackworth, N. H.,	*Science*
Lawrence, Frederick Cross,	Minneapolis, Minn.,	*Science & Letters*
Lawrence, James Suydam,	Seneca Falls,	*Literature, Opt.*
Leary, James Thomas,	Ithaca,	*Science and Letters*
Leeds, Charles Starr,	Richmond, Ind.,	*Science and Letters*

Leighton, Herbert Jackson,	Ithaca,	*Mechanic Arts*
Lovelace, Frederic Lauren,	Dundee,	*Philosophy*
Mack, George William,	Ithaca,	*Mechanic Arts*
Manierre, Charles Edward,	Chicago, Ill.,	*Natural History*
Mann, Gustav Marcus,	Milwaukee, Wis.,	*Agriculture*
McCrea, Clark Waldo,	Eagle Rock, Pa.,	*Engineering, Opt.*
Mendes, Octaviano Abdon Pereira,	S. Paulo, Brazil,	*Architecture*
Mesick, David Wilson,	Kinderhook,	*Engineering*
Messenger, Hiram John,	Cortland,	*Literature*
Mills, Arthur Eugene,	New York City,	*Architecture*
Morris, Robert Tuttle,	New Haven, Ct.,	*Natural History, Opt.*
Nixon, Charles Elstun,	Chicago, Ill.,	*Optional*
Norton, Henry Mark,	New York City,	*Agriculture*
Norton, James Eddy,	Belmont,	*Literature*
O'Brien, Michael John,	Bergen,	*Science*
Ormsby, Frank Worden,	Oswego,	*Engineering*
Otis, George Franklin,	Boston Mass.,	*Mechanic Arts*
Pennock, Charles John,	Ithaca,	*Agriculture*
Phelps, Susanna Stuart,	Morrisville,	*Philosophy*
Pierce, Henry,	Pawling,	*Engineering, Opt.*
Poole, Murray Edward,	Ithaca,	*Arts*
Randolph, Nathaniel Archer,	Chadd's Ford, Pa.,	*Science*
Roberts, Mary Elizabeth,	Ithaca,	*Philosophy*
Rose, Alice Evelyn,	Cleveland, O.,	*Science and Letters*
Rudd, Willis Nathaniel,	Ithaca,	*Natural History*
Rundell, Forest Parlen,	De Kalb Junction,	*Optional*
Russel, Willliam Channing, Jr.,	Ithaca,	*Arts*
Schumm, George,	San Francisco, Cal.,	*Optional*
Scott, Frank Jeremiah,	Jordon, Minn,,	*Mechanic Arts*
Shackford, Lucy Bartlett,	Ithaca,	*Literature*
Sheldon, Charles Stiles,	Oswego,	*Natural History*
Sibley, Edwin Henry,	Franklin, Pa.,	*Arts*
Slauson, Allan Bedient,	Weedsport,	*Science and Letters*
Smith, Cornelia Delap,	Cambridge, Mass.,	*Arts*
Smith, Frederick William,	Ithaca,	*Arts*
Smith, Robina Silsbee,	Cambridge, Mass.,	*Arts*
Snyder, Harry Wilson,	Freeport, Ill.,	*Agriculture, Opt.*

Soule, Henry Howard,	Syracuse,	*Science and Letters*
Stanton, Robert Livingston,	Tenafly, N. J.,	*Science and Letters*
Stricker, Enoch Leon,	Tiffin, O.,	*Philosophy, Opt.*
Terry, Edmund Burke,	Waterville,	*Science and Letters*
Thomas, Frank Salter,	Bay Ridge,	*Science and Letters*
Tidball, John Satterlee,	Fort Monroe, Va.,	*Science and Letters*
Tiffany, Frank Giles,	Gainesville,	*Science and Letters*
Tilton, John Neal,	Rome, Italy,	*Architecture*
Tracy, Aurelius Milford,	Ghent,	*Science and Letters*
Trelease, William,	Brooklyn,	*Natural History*
Turner, Samuel Bates,	Ithaca,	*Literature*
Upjohn, Richard Russell,	Brooklyn,	*Engineering*
Vail, Alfred Tennyson,	Chester,	*Science*
Vance, Lee James,	Penn Yan,	*Science and Letters*
Wagner, Charles Gray,	Whitesboro,	*Natural History*
Waterbury, John Calvin,	Rensselaerville,	*Mechanic Arts, Opt.*
Webster, Hosea,	Oyster Bay,	*Science and Letters*
White, Fred. Davis,	Ithaca,	*Science and Letters*
Whitney, Frank Curtis,	West Danby,	*Arts*
Wilhelm, Henry Walter,	Toledo, O.,	*Architecture*
Wilson, James Meredith,	Riverton, Ill.,	*Philosophy, Opt.*
Wing, Albert John,	Albany,	*Science and Letters*

IN THE SECOND YEAR OR SOPHOMORE STUDIES.

Ainslie, James Stewert,	Hartwick,	*Arts*
Allen, John Granger,	Aurora,	*Mechanic Arts*
Alling, Robert Bertine,	Bangall,	*Science and Letters*
Ayers, William Judson,	Cairo, Ill.,	*Science and Letters*
Aylen, Henry,	Aylmer, Canada,	*Philosophy, Opt.*
Barnes, Justin Llewellyn,	Boston, Mass.,	*Science and Letters*
Bates, William Horatio,	Washington, D. C.,	*Agriculture*
Battin, Henry Wilson,	Albany,	*Engineering*
Beach, William Brewster,	Brooklyn,	*Agriculture*
Benedict, Thomas, Jr.,	Pittston, Pa.,	*Engineering*
Bennitt, Francis Marion,	Big Flats,	*Optional*

Booth, Quentin Woodbury,	Rochester,	*Mechanic Arts*
Bowman, Seward Lincoln,	New Lisbon, O.,	*Science and Letters*
Boyer, Lyman Fremont,	Freeport, Ill.,	*Science and Letters, Opt.*
Brader, William Barton,	White Haven, Pa.,	*Optional*
Brown, William Clinton,	Sandusky, O.,	*Mechanic Arts*
Bullis, Abram Rogers,	Macedon,	*Mathematics*
Burr, Ella,	Newark Valley,	*Literature*
Burr, George Lincoln,	Newark Valley,	*Arts*
Campbell, Edwin,	Mumford,	*Science and Letters*
Candee, Fred Jason,	Moline, Ill.,	*Optional*
Carey, Frank,	Fond du Lac, Wis.,	*Science and Letters*
Carman, Frederick Douglass,	Jacksonville,	*Arts*
Cartwright, Robert, Henry,	Rochester,	*Mechanic Arts*
Catchpole, Edwin Watson,	Rose,	*Agriculture*
Cheney, Miles Eugene,	Bemus' Point,	*Philosophy*
Chittenden, Frank Hurlbut,	Brooklyn,	*Natural History, Opt.*
Clarke, Percy Edwards,	Washington, D. C.,	*Science and Letters*
Cole, Ernest Henry,	St. Louis, Mo.,	*Optional*
Collins, Homer,	Rochester,	*Optional*
Collmann, John Saunders,	Freeford Falls, Ill.,	*Science and Letters*
Concklin, Henry Sisson,	Poughkeepsie,	*Arts, Opt.*
Copp, Fred Malin,	Jordan,	*Science*
Cornell, George,	Central Valley,	*Science and Letters*
Cowles, Albert Hutchingson,	Cleveland, O.,	*Science and Letters*
Curtice, Fred Cooper,	West Winsted, Ct.,	*Natural History*
Davenport, Clinton Arthur,	Varna,	*Arts*
Day, Harriet McHarg,	Cooperstown,	*Arts*
Dominick, DeWitt Clinton,	Gallupville,	*Science and Letters*
Downing, Elizabeth,	Ithaca,	*Science and Letters*
Ehrlicher, Frederick Matthias,	Watertown,	*Literature, Opt.*
Eidlitz, Otto Marc,	New York City,	*Engineering*
Fifield, Annie Laurie,	Worcester, Mass.,	*Literature, Opt.*
Flanigan, Walter Jerome,	Binghamton,	*Arts*
Fort, Phebe Irene,	Albany,	*Science and Letters*
Freeman, George Wiley,	Dover, N. H.,	*Engineering*
Gilbert, Rizpah Margaret,	Le Roy,	*Philosophy*
Goddard, Alice,	Worcester, Mass.,	*Arts*

Griffith, William Ross,	Brooklyn,	*Optional*
Gusdorf, Moses,	Fremont, O.,	*Arts, Opt.*
Hahn, Albert George Charles,	Brooklyn,	*Agriculture*
Halpen, David Patrick,	Albany,	*Science and Letters, Opt.*
Halsey, David Rogers,	Bridgehampton,	*Arts*
Harding, Frank,	Callicoon,	*Science and Letters*
Harlow, Gertrude Burt,	Syracuse,	*Arts, Opt.*
Hawkins, Carlton Richmond,	East Hamburg,	*Engineering*
Herrick, William Porter,	East Randolph,	*Literature*
Heyl, Harriet,	Dunkirk,	*Literature*
Hoag, William Isaac,	Aurora,	*Science*
Holcomb, James Warren,	Ravenna, O.,	*Science and Letters*
Holmes, Joseph Austin,	Laurens, S. C.,	*Agriculture*
Holmes, William David,	Pittsburgh, Pa.,	*Chem. and Physics*
Hornor, Charles West,	New Orleans, La.,	*Chem. and Physics*
Hosea, Joseph Chase,	Clifton, O.,	*Engineering, Opt.*
House, Edward Mandle,	Houston, Texas,	*Science and Letters*
Howell, Frederic James,	Keokuk, Iowa,	*Science and Letters, Opt.*
Howland, Isabel,	Sherwood,	*Philosophy*
Hoyt, William Ballard,	East Aurora,	*Arts, Opt.*
Hungerford, Nye,	Ithaca,	*Agriculture*
Hunter, Nathaniel Perry,	Jasper,	*Arts, Opt.*
Jaynes, DeLos Dan,	North Norwich,	*Science and Letters*
Kelso, John Sinclair,	Stamford, Ct.,	*Optional*
Kilbourne, Frederic Lucius,	Moravia,	*Agriculture*
Latham, William Arthur Swaby,	Seneca Falls,	*Science and Letters, Opt.*
Locke, Henry Lincoln,	West Dedham, Mass.,	*Agriculture*
Lounsberry, John Wesley,	Hammondsport,	*Literature, Opt.*
Martin, George,	Alleghany City, Pa.,	*Optional*
Marvin, Charles Deming,	Montclair, N. J.,	*Architecture*
McArthur, William Carse,	Burlington, Ia.,	*Science and Letters, Opt.*
McConnell, Benjamin Franklin,	Chicago, Ill.,	*Optional*
McCorn, William Alfred,	Newfield,	*Natural History, Opt.*
Miller, Irvine,	Washington, D. C.,	*Literature*
Moses, Willis Holley,	Malone,	*Science and Letters*
Moulton, Guy,	Cicero,	*Science and Letters*
Northrop, May,	Woodhull,	*Science and Letters*

Ostrander, Will Sterling,	Schuylerville,	*Science and Letters*
Palmer, Edgar Anson,	Cortland,	*Mechanic Arts*
Palmer, Milton Cornelius,	Sing Sing,	*Science and Letters*
Parke, Henry Tyllmann,	Binghamton,	*Arts*
Parmelee, Robert Murray,	Cleveland, O.,	*Science and Letters*
Parmenter, Syrel,	Cohocton,	*Science and Letters*
Perkins, Ida May,	Wilmington, Del.,	*Optional*
Pidgeon, John Johnston,	Brooklyn,	*Engineering, Opt.*
Place, Ira Adelbert,	Alfred Centre,	*Arts*
Read, Jesse Edwin,	Greenpoint,	*Engineering*
Reeve, Benjamin Harry,	Mattituck,	*Science and Letters*
Rhodes, Kate,	Trempealeau, Wis.,	*Optional*
Rich, Fred William,	West Potsdam,	*Science*
Rites, Francis Marion,	Chester,	*Mechanic Arts*
Roberts, David Evan,	Constableville,	*Optional*
Roehrig, Fred Lewis,	Ithaca,	*Architecture*
Ryman, Frederick Sweasy,	Dallas, Pa.,	*Arts, Opt.*
Salisbury, Herbert Lucius,	Marcellus,	*Mechanic Arts*
Saunders, Charles Lockard,	Omaha, Neb.,	*Optional*
Schuyler, Sage White,	Ithaca,	*Mechanic Arts, Opt.*
Seymour, Frederick Hubert,	Lockport,	*Mechanic Arts*
Shinkle, John Newton Dexter,	Rochelle, Ill.,	*Science and Letters*
Shiras, George,	Pittsburgh, Pa.,	*Science and Letters*
Shnable, Emile Ralph,	Chicago, Ill.,	*Engineering*
Simmons, Parke Edmund,	Clarence, Ia.,	*Arts, Opt.*
Skinner, James Henry,	Faribault, Minn.,	*Science and Letters*
Smith, Edward Sholl,	Canajoharie,	*Science and Letters*
Smith, Theobald,	Albany,	*Philosophy*
Sommers, Harry Cantine,	Ithaca,	*Arts*
Spencer, Stella Diantha,	Unadilla,	*Literature, Opt.*
Stambaugh, Henry Hamilton,	Youngstown, O.,	*Optional*
Stearns, James Brainard,	Rouse's Point,	*Arts*
Storey, William,	Rochester,	*Optional*
Studley, Duane,	South Byron,	*Science and Letters*
Taylor, Martin Albert,	Ithaca,	*Science and Letters*
Taylor, Oscar Livingstone,	Freeport, Ill.,	*Science and Letters*
Teague, Clara Louisa,	Caribou, Me.,	*Science and Letters*

Thomas, Charles Elu,	Waterloo,	*Agriculture*
Thompson, Ervin William,	Smithville, Ga.,	*Mechanic Arts*
Tompkins, Myron,	Ithaca,	*Optional*
Trainer, John Walter,	Steubenville, O.,	*Optional*
Upton, Charles Olmsted,	Clymer,	*Agriculture*
Van Ness, James Robertson,	Osborn's Bridge,	*Science and Letters*
Vaughn, Edward Gilpin,	Richmond, Ind.,	*Science and Letters*
Walters, William Andrew,	Phoenix,	*Architecture*
Waterbury, Henry Talmadge,	Rensselaerville,	*Mechanic Arts*
Watson, George Catchpole,	Clyde,	*Agriculture*
Wendell, Henry Ten Eyck,	Chicago,	*Architecture*
Wick, Richard Brown,	Pittsburgh, Pa.,	*Engineering*
Wightman, Willard Humphrey,	Hastings,	*Engineering*
Wing, Henry Hiram,	Willow Brook,	*Agriculture*
Wilson, Josiah Dustin,	N. Haverhill, N. H.,	*Chem. and Physics, Opt.*
Withington, Alfreda Bosworth,	South Amboy,	*Arts*

IN THE FIRST YEAR OR FRESHMAN STUDIES.

Adams, John Davis,	Plainville, N. J.,	*Literature*
Arnold, Bishop,	Rochester,	*Mechanic Arts*
Ayeres, Mary Frances,	Ithaca,	*Literature*
Baker, Leslie Arthur,	Olean,	*Agriculture*
Barber, Edwin Louis,	Wauseon, O.,	*Science and Letters*
Becher, Franklin Augustus,	Milwaukee, Wis.,	*Science and Letters*
Beebe, George,	Penn Yan,	*Science and Letters*
Bellows, Elmer Ellsworth,	Albany,	*Mechanic Arts*
Bowen, Anna Cornelia,	Batavia,	*Arts*
Brown. Arthur Page,	Adams,	*Architecture*
Brown, Frederick Lord,	Sag Harbor,	*Architecture*
Brunn, Armin Earnest,	New York City,	*Agriculture*
Busch, John,	Ellenville,	*Chem. and Physics*
Carolan, Frank,	San Francisco, Cal.,	*Science and Letters*
Carlson, Eleanore Frederica,	Owego,	*Literature*
Carmody, Thomas,	Bellona,	*Science and Letters*

Carpenter, Calvin,	Troy,	*Literature*
Casey, Patrick Joseph,	Binghamton,	*Arts*
Catlin, Frederick Miles,	Erie, Pa.,	*Arts*
Chandler, Frances Harden,	Concord, N. H.,	*Optional*
Chester, Frederic Dixon,	St. Louis, Mo.,	*Science and Letters*
Cooper, Jere Frank Bower,	Palo, Ill.,	*Arts, Opt.*
Cole, Chester Glen,	Corning,	*Literature*
Cowell, Alexander Tyng,	Erie, Pa.,	*Literature*
Crider, Rollin Frederick,	Greenville, O.,	*Science and Letters*
Curtis, Ida Maynard,	Boston, Mass.,	*Science and Letters*
Cushing, Harry Platt,	Cleveland, O.,	*Philosophy*
Dibble, Henry Montgomery,	Marshall, Mich.,	*Literature*
Dormitzer, Walter,	New York City,	*Optional*
Dugger, John Alonzo,	Eden, Ga.,	*Arts*
Fairbanks, Leland,	New York City,	*Mechanic Arts*
Fairchild, Tracy Rasselas,	Ovid,	*Engineering*
Fisk, Ephraim John,	Lebanon,	*Science and Letters*
Fiske, Ferdinand Comstock,	Maquoketa, Ia.,	*Mechanic Arts*
Foncar, Edward Louis,	Boston, Mass.,	*Mechanic Arts*
Fowler, Mary,	Governeur,	*Science and Letters*
Gill, Francis Beaman,	Antwerp,	*Science and Letters*
Grant, Edith,	New York City,	*Philosophy*
Gritman, William Ball,	Carbondale, Pa.,	*Optional*
Hannis, Clara Louise,	River Head,	*Literature, Opt.*
Harding, William Elias,	Bethany,	*Engineering*
Hatch, Arthur Gillespie,	Perry,	*Science and Letters*
Heermans, Thaddeus Willson,	Chicago, Ill.,	*Mechanic Arts*
Hill, Laura,	St. Johnsville,	*Optional*
Hiscock, Albert King,	Syracuse,	*Arts*
Holman, Julian,	Bolton, Mass.,	*Agriculture*
Horr, Norton Townshend,	Wellington, O.,	*Science and Letters*
Horr, Rollin Cortland,	Wellengton, O.,	*Science and Letters*
Hutchinson, Douglas Welton,	Chicago, Ill.,	*Engineering*
Ingersoll, John Carter,	Washington, D. C.,	*Optional*
Johnson, Edward Newton,	Reading, Pa.,	*Arts*
Jones, George Augustus,	Addison, Ia.,	*Agriculture*
Jones, Hervey Brayton,	Westernville,	*Natural History, Opt.*

Kenney, Eudorus Catline,	Truxton,	*Philosophy*
Kent, Samuel Leonard,	Clifton Heights, Pa.,	*Mechanic Arts*
Kent, William Archie,	Oil City, Pa.,	*Science and Letters*
Kidder, Francis Henry,	Keesville,	*Arts, Opt.*
Krüsi, Hermann,	Oswego,	*Engineering*
Leary, Frank,	Ithaca,	*Science and Letters*
Luckey, Frank Ranney,	Poughkeepsie,	*Science and Letters*
Matthews, PeterBalde y,	Plainfield, N. J.,	*Mechanic Arts*
McDermid, Andrew Jackson,	Marshall, Mich.,	*Agriculture*
McLennan, Christiana,	Elgin,	*Optional*
Minshall, Charles,	Terre Haute, Ind.,	*Optional*
Morton, Oliver Throck,	Indianapolis, Ind.,	*Arts, Opt.*
Moses, Fred Augustus,	Rochester,	*Engineering*
Mott, Seward,	Bouckville,	*Science and Letters*
Murphy, Smith,	Moravia,	*Agriculture*
Neymann, Olga,	New York City,	*Literature*
Nichols, Harvey Bartlett,	Fond du Lac, Wis.,	*Science and Letters*
Pennock Theodore,	Ithaca,	*Agriculture, Opt.*
Pfeiffer, Edward Philip,	New York City,	*Optional*
Pierce, Daniel Addison,	Baldwinsville,	*Philosophy*
Pitcher, Charles Daniel,	Owego,	*Arts*
Pratt, Ransom,	Corning,	*Science and Letters*
Purdy, Markwell Seward,	Corning,	*Arts*
Putnam, Mary Chastina,	Ellington,	*Literature*
Raekemann, Felix,	Lenox, Mass.,	*Science and Letters*
Rappleye, Walter Glazier,	Minetto,	*Science and Letters*
Reading, William Borton,	West Falls,	*Science and Letters*
Reed, Jared Ackerson,	Ontario,	*Arts*
Robie, Harry Adams,	Marathon,	*Mechanic Arts, Special*
Roberts, Willis Markel,	Seneca Falls,	*Mechanic Arts*
Root, Daniel Bayard,	Port Byron,	*Arts*
Rüdiger, John Max,	Brooklyn,	*Mechanic Arts, Opt.*
Sanders, Alvin Howard,	Chicago, Ill.,	*Science and Letters*
Saze, Hidesabro,	Tokio, Japan,	*Agriculture*
Schenck, Herbert Dana,	Union Springs,	*Literature*
Sears, Stephen Parrish,	Buffalo,	*Literature*
Serat, Mortimer Edgerton,	Elmira,	*Mechanic Arts*

Shiras, Winfield Kennedy,	Pittsburg, Pa.,	*Literature*
Shorter, Thomas Jaye,	Aurora,	*Optional*
Sibley, Lucy Culver,	Cuba,	*Science and Letters*
Smith, Delano Eugene,	New York City,	*Arts*
Smith, Henry Willis,	Woodbourne,	*Science and Letters*
Smith, Hermon Woodworth,	Trumansburg,	*Science*
Smith, Isaac Parshall,	Ithaca,	*Arts*
Smith, Joseph Lesley,	Canajoharie,	*Natural History, Opt.*
Smith, Morace Francis,	McLean,	*Arts*
Sommers, Frederick Skelding,	Ithaca,	*Science*
Soper, Grace Weld,	Waltham, Mass.,	*Arts*
Souter, Richard Francis,	Corry, Pa.,	*Philosophy*
Streeter, Howard Malcolm,	Tunkhannock, Pa.,	*Arts*
Suydam, Frederick,	Baldwinsville,	*Science and Letters*
Taylor, William Montgomery,	Rochelle, Ill.,	*Agriculture, Opt.*
Thompson, Madeline Sylvester,	Ithaca,	*Science and Letters*
Trumbull, William,	Sandy Hill,	*Science and Letters*
Tucker, John Thomas,	Varna,	*Agriculture, Opt.*
Tuthill, James Fred,	Corning,	*Philosophy*
Van Pelt, Elizabeth Vandenburg,	Trumansburg,	*Science and Letters*
Van Pelt, Gertrude Wyckoff,	Trumansburg,	*Science and Letters*
Wait, John Cassan,	Norwich,	*Engineering*
Waldo, Gerald,	Scotland, Ct.,	*Agriculture*
Washburne Frank Sherman,	Chicago, Ill.,	*Engineering*
Webster, John Guerdon,	Bath,	*Natural History*
Wilkinson, Marion,	Syracuse,	*Arts*
Williams, Isaac,	Niagara, Canada,	*Agriculture*
Wilson, Dora Frank,	Ithaca,	*Science and Letters*
Wilson, Frank Thomas,	Corry, Pa.,	*Science and Letters*
Woodard, James Allen,	Elma,	*Arts*
Woodruff, Edwin Hamlin,	Ithaca,	*Science and Letters*
Wright, George Herdman,	Buffalo,	*Arts*
Wynkoop, Tobias Bion,	Ithaca,	*Agriculture*
Yeaw, Everett,	Lawrence, Mass.,	*Arts*

SUMMARY BY YEARS.

Post Graduates	15
In Senior or Fourth Year Studies	81
In Junior or Third Year Studies	118
In Sophomore or Second Year Studies	138
In Freshman or First Year Studies	124
	476

SUMMARY BY COURSES.

Courses.	Seniors.	Juniors.	Soph.	Fr.	Total.
Arts	8	10	20	22	60
Literature	10	8	8	13	39
Philosophy	1	6	5	6	18
Science	1	5	3	2	11
Science and Letters	32	37	40	34	143
Chemistry and Physics	0	1	3	1	5
Mathematics	1	0	1	0	2
Natural History	1	8	3	3	15
Agriculture	2	12	12	13	39
Architecture	4	6	4	2	16
Civil Engineering	13	11	11	7	42
Mechanic Arts	4	6	11	12	33
Optional	4	8	17	9	38

Total of Undergraduates	461
Post Graduates	15
Total in the University,	476

THE CORNELL UNIVERSITY.

GENERAL VIEW.

FOUNDATION.

The existence of the Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge of tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts, amounting to several hundred thousand dollars.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation" and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based.

In accordance with the requirements of its charter, the Institution was duly opened on the seventh of October, 1868.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868-69—provides for the support and maintenance of colleges, "where," in the language of the Act, "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches as are related to Agriculture and the Mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated.

THE UNIVERSITY AND THE STATE.

The Act of Incorporation after citing the words of the Congressional Act (declaring the leading purpose of the land grant), adds. "And such other branches of Science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University as the Trustees may deem useful and proper."

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students.

The Trustees of the University have placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four for each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of nearly forty thousand dollars *per annum*.

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Technical Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, or Natural History; or he may, subject to the approval of the Faculty, take an *Optional Course*, under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. No student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which might otherwise occur,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to consult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University; otherwise the student will be compelled to wait and thus lose one year of his scholarship. The successful candidate is subject to the usual entrance examination on arriving at the University. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-three. Of these, the eldest son of the Founder is, by the law of the State, a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of

Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, hold frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the supervision of the various courses of study, and such duties as generally appertain to an academic Faculty. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties:

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient Classical Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History. Each of these Faculties have special charge of the studies in some one or more of the General Departments of study.

TERMS AND VACATIONS.

The Academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-seven weeks of term-time in the academic year.

For the beginning and ending of terms and vacations of each year, and other matters of detail relating to them, see the Calendar, p. 7 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince misapprehension in regard to its plan and organization. This has rendered the subjoined statements necessary:—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactorily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students from any State or country.* Free instruction for undergradutes is given only to State Students, and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York But all others are received, whatever may be the State or

country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows:—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers,* some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which result from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

3. *The Prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

RELIGIOUS INSTRUCTION.

The University was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view. It would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

In the University Chapel—the gift of Henry W. Sage—religious services are held, in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. These discourses are delivered during the first and third terms of each year, and usually two on each Sunday.

HIGHER EDUCATION OF WOMEN.

It was the wish of the Founder and other influential friends of the University, from the first, that it should be open and its means and facilities for education should be offered to all, irrespective of sex, color, or nationality. And by an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building—the Sage College for Women has been completed and is in readiness for use. There is no separate Course or Department for women students, the Entrance Examinations are the same for them as for the young men and depend upon the course they intend to pursue. Neither are there any separate classes formed for them, the only distinction made is, that a separate building has been provided by the liberality of Mr. Sage for them to live in, if they choose to avail themselves of the opportunity. While the leading object of the movement is perhaps to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course, those who have been chiefly instrumental in making these arrangements, are earnest believers in the co-education of the sexes.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through academy, college, etc., up to the fullest development of educational resources in a well endowed and completely

equipped university, with its technical departments for the useful Arts and its professional schools for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate Degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate Degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its professors, are placed at the service of its own graduates, and of the graduates of like standing from other colleges and universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they have occasion to use in the prosecution of their studies and investigations. Already quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate professor or Special Faculty.

SELF-SUPPORT BY STUDENTS.

Young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and in a very few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. Self-

support, to any extent, requires energy, persistence and sacrifice; and even a skillful mechanic should have some means in reserve, so that his energies in the University will not be diverted from mental to manual labor. Most of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work: but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. The number of young men applying for such labor has constantly exceeded the number that the University is able to employ; and it must be distinctly understood that the University will not *guarantee employment to any student.*

THE UNIVERSITY TOWN.

The University is situated on grounds overlooking ITHACA, a town of about twelve thousand inhabitants, at the head of Cayuga Lake, in Tompkins County, New York.

The town has five distinct lines of communication with the great thoroughfares, viz:

The *Geneva, Ithaca and Sayre Railroad*, running south, connecting with the Lehigh Valley Railroad for Towanda, Bethlehem, Philadelphia, etc; running north-west to Geneva and Lyons on the New York Central and Hudson River Railroad. The *Cayuga Railway*, running north to Cayuga on the New York Central and Hudson River Railroad. The *Cayuga Lake Steamers*, during navigation, running north to Cayuga on the New York Central and Hudson River Railroad. The *Cayuga and Susquehanna Division* of the *Delaware, Lackawanna and Western Railroad*, running south to Owego on the New York, Lake Erie and Western (formerly Erie) Railway. The *Utica, Ithaca and Elmira Railway* starts from the immediate vicinity of the University buildings and, running north-east, connects at Cortland for Syracuse and at Canastota with the New York Central and Hudson River Railroad; running south-west to Elmira on the New York, Lake Erie and Western (Erie) Railway, connects with the Northern Central Railway for Harrisburg, Baltimore, Washington, etc.

SCOPE OF THE INSTRUCTION.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words:—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

The instruction given in the University is distributed into several Departments, some of which are subdivided into Schools; and out of these Schools and Departments there are made up four General Courses and six Technical or Special Courses, as will be seen more fully below under the head of "Courses of Study."

I. DEPARTMENT OF AGRICULTURE.

The simple requirements for admission to the Course in Agriculture put the advantages which it offers within the reach of every enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in Agriculture before any others who may wish for this work.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the

class-room exercises, the student devotes as much time as can be profitably spared for the purpose, to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

Students in the Department of Agriculture enjoy, in common with all members of the University, the privilege of using the University Library, and of attending any lectures given in the University.

In Practical Agriculture five hours weekly during the senior year are devoted to technical instruction; this time being divided between lectures, reviews, agricultural calculations and farm accounts. Besides this the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

Tuition is *free of charge.* Students in Agriculture, whether optional or in either of the two regular courses, are required to do a certain amount of farm work *without compensation* as part of their instruction.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas's "American Fruit Culturist;" Kent's "Landscape Gardening."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Anderson's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius's "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening."

VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:—1. Five lectures a week extending over the entire academic year. 2. Laboratory work on the bones, skeletons,

clastic models, pathological preparations, and parasites of the domestic animals. 3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm, the various systems of organs and functions being taken up in turn and the differences pointed out together with the bearing of these variations on their healthy management and diseased processes. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses, such as draught, speed, endurance, early maturity and propensity to fatten, milking qualities, etc.; to the data for determining the age; to the principles of breeding, of shoeing, etc.

The Second Term is appropriated to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals and of veterinary surgery. The general principles which must guide in all surgical manipulations are stated, the various operations practiced on the domestic animals are described, and these are illustrated when suitable subjects present themselves.

In Veterinary Science an opportunity is afforded to students who desire it, to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study of the School.

Text-Books.—Chauveau's "Comparative Anatomy of the Domestic Animals;" Colin's "Physiologie des Animaux Domestiques;" Marshall's Outlines of Physiology;" Law's "Principles and Practice of Veterinary Medicine and Surgery."

Books of Reference.—Leyh's "Handbuch der Anatomie der Hausthiere;" Gamgee and Law "Anatomy of the Domestic Animals;" Stephen and Seller "Physiology at the Farm;" Goodale's "Breeding;" Low's "Domesticated Animals;" Gamgee's Domestic Animals in Health and Disease;" Percivall's "Hippopathology;" Williams' "Principles and Practice of Veterinary Medicine and Surgery;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Baumeister's "Geburtshülfe;" Rainard's "Parturition;" Delwart's "Parturition;" Fleming's "Veterinary Sanitary Science

and Police;" Reynal's "Traité de la Police Sanitaire;" Miles "On the Foot;" Rey's "Marechalerie;" Bouley and Reynal "Dictionaire de Médicine Vétérinaire."

II. ARCHITECTURE.

The course of study in Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Faculty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practiced in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Any student may attend the lectures on building materials and construction; but, with these exceptions, all students entering the department will be required to pursue the regular course of study, prescribed for the Degree of Bachelor of Architecture.

III. CHEMISTRY AND PHYSICS.

I. SCHOOL OF CHEMISTRY AND MINERALOGY.

The instruction in chemistry begins with the lectures on general chemistry in the second term of the Sophomore year. During that and the succeeding term three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. In addition to the final examination at the end of each term occasional examinations are held during the term of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times. During the first term of the Junior year a course of lectures will be given on the chemistry of organic bodies; it will be restricted to the consideration of the more frequently occurring bodies of organic origin, which the student is constantly meeting in his every-day life.

The Introductory Chemical Practice may be taken in the second Sophomore term, but is required of all students in the

Special Course in Science in the third term. This practice consists in the performance by the student of a series of experiments contrived and arranged for the illustration of the more important general principles of chemistry, as well as for the cultivation of his powers of observation; while the details of the manipulation of each experiment are carefully described, the student is required to observe the results for himself and trace their connection with the principle illustrated.

The Special Chemical Course.—This is arranged for those desiring to accomplish as much as possible during the four years of a college course towards fitting themselves for the profession of chemistry. It includes, besides some study of other sciences, of mathematics, and French and German, attendance on lectures on general, organic, technical, and analytical chemistry, and a course of practice in qualitative analysis, including blow-piping, and in quantitative analysis, including assaying, the analysis of ores and minerals in the wet way, of organic substances, waters, gases, articles of food, etc.

Agricultural Chemistry.—This comprises a course of lectures on the chemistry of the elementary and compound substances concerned in the growth of plants and animals, the chemistry of vegetable and animal life, of soils and manures, and of agricultural technology. The laboratory practice, except in the full course of four years, is confined to the qualitative and quantitative analysis of such substances as may be met with in the course of ordinary agricultural practice, and requires from four hundred to four hundred and fifty hours for its completion.

Chemical Technology.—A course of lectures is given, in the third terms of two successive years, on the applications of chemistry in the arts and industries. It will embrace the study of the chemical principles involved, and of the manipulation required, in the commercial preparation of acids, alkalies, salts, fats, oils, soaps, coal gas, coal tar, coloring matters, glass, pottery, mortars, textile fabrics, leather, paper, etc. The course will be supplemented by excursions to such mills and manufactories as are accessible, and by special laboratory practice in the detection of adulterations, and the valuation of commercial samples.

Medical Chemistry.—This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Course in blow-piping.—This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work,

when it becomes necessary to make out the character of a rock or mineral.

Metallurgy and Mineralogy.—During the second term two lectures a week are devoted to each of these subjects in alternate years. The course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction; the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in Blow-pipe Analysis with practice in the identification of crystalline forms is required in connection with the lectures on Mineralogy.

Laboratory expenses.—Students in the laboratory will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices. They will be required to make a deposit with the Treasurer of a small sum to cover these charges, before beginning work in the laboratory, except when delay is allowed by special permission of the professor in charge.

Text books and works of reference.—Thorpe "Inorganic Chemistry;" Barker, "College Chemistry;" Caldwell and Breneman, "Introductory Chemical Practice;" Crafts, "Qualitative Analysis;" Fresenius, "Qualitative Chemical Analysis" and "Quantitative Chemical Analysis;" Caldwell, "Agricultural Chemical Analysis;" Elderhorst, "Blow-pipe Analysis;" Kerl, "Probirkunst;" Plattner, "Use of the Blow-pipe;" Sutton, "Volumetric Analysis;" Mohr, "Titrirmethoden;" Thorpe, "Quantitative Chemical Analysis;" Rose, "Chimie Analytique;" Burdon-Sanderson, "Handbook for the Physiological Laboratory;" Storer, "Dictionary of Solubilities;" Gmelin, "Handbook of Chemistry;" Miller, "Elements of Chemistry;" Watts, "Dictionary of Chemistry;" Schorlemmer, "Organic Chemistry;" Wurtz, "Dictionnaire de Chimie;" Graham-Otto, "Lehrbuch der Chemie. Handwörterbuch der Chemie."

II. SCHOOL OF PHYSICS.

The instruction in the general course in Physics begins with the first term of the second year and continues six terms, as follows:—

First term.—Mechanics of solids, liquids, and gases. Three exercises per week. *Second and third terms.*—Magnetism and electricity. Two exercises per week. *Fourth term.*—Heat. Two exercises per week. *Fifth and sixth terms.*—Acoustics and optics. Three exercises per week.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference;—Atkinson's Ganot's "Physics," Jamin's "Cours de Physique" and "Petit Traité de Physique," Müller's "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics," Jenkin's "Electricity and Magnetism," Maxwell's "Theory of Heat," Schellen's "Spectrum Analysis."

Besides the above general course, there will be an opportunity for a few students who wish to make Physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course:—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

IV. CIVIL ENGINEERING.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analysis to the solution of engineering investigations, the professional preparation of the students comprises the following subjects:—Free-hand drawing, machine-shop practice, blowpipe analysis of minerals, geology, elementary and structural, metallurgy; the location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The sphere of action of the Civil Engineer is so broad and diversified, that no educated engineer pretends to be equally well prepared in all the various specialties into which the profession has been subdivided by social necessities and common consent. To

meet the loud demand for special engineering studies, efforts will be made from the beginning of the third year of the course, to allow of option and diversity of special studies, so far as the means at our disposal will allow. In this manner this department will foster the development of special fitness among the various classes of students, who by natural inclination may prefer a more or less extended study of any particular branch of Civil Engineering.

The great subdivisions of the work under this department are:—Hydraulic engineering, railroad engineering, bridge architecture and construction, topographical engineering, industrial engineering and mining engineering.

At present we have no more than general facilities for beginning the education of Industrial and Mining Engineers, and we are not prepared to offer superior inducements to students pursuing these important branches as a specialty. Appropriate chairs for this purpose will be created at an early day.

We can offer, however, a complete theoretical and practical course in Civil Engineering, embracing a thorough treatment of the first four great subdivisions enumerated above.

The course in Topographical Engineering is designed for those students who may find distasteful the investigation of the higher mechanics as applied to civil constructions, and who may show, instead, special aptitude for geodetical work. Since the recent great surveying expeditions sent out by the U. S. government took the field, there has been an incessant demand for men specially fitted for the important duties of the explorer and the geographical engineer; and in the work of our well known U. S. Coast Survey, there is also an ample field for the efforts of properly trained geographers and topographers. To provide for this and similar demands, a special course is now in full operation. It is properly manned by efficient instructors and its equipment of general and special instruments has been collected at great expense and is very complete. During their connection with this department students taking the course in Topographical Engineering will have an opportunity to perform work as accurate and extensive as is done in the actual details of the U. S. Coast Survey, and in the geodetic surveys of European governments.

Besides the above, there is a course in Surveying and another course in Draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading pen and colored topography, machine drawing, and the use of projection tables.

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The degree of Civil Engineer is conferred, on the recommendation of this Faculty, upon those who, having taken the Bachelor's degree, shall have spent two years in additional special studies and actual practice, passed the requisite examinations, and presented a satisfactory thesis.

V. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others.

In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history—and thus to enlarge, by careful reference and reading, their acquaintance with the facts presented by the lecturers. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern civilization.

The School of Political Science, is intended to embrace all the important topics connected with political and social science. At present, courses of lectures are delivered, as will be seen below, on political economy and constitutional law.

The following is a list of the lectures given in this department:—
(1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2.) Modern history, and the philosophy of modern history, by President White. (3.) The general and constitutional history of England, by Professor Goldwin Smith. (4.) General history, and the philosophy of history, by Professor Wilson. (5.) History of the United States. (6.) American constitutional history, by Professor Dwight. (7.) Political economy, by Professor Wilson.

VI. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

I. SCHOOL OF THE ANCIENT LANGUAGES.

1. THE GREEK LANGUAGE.

FIRST YEAR.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

SECOND YEAR.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Phoenissae); Æschylus (Septem); Aristophanes (Acharnians).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII, and Curtius' History of Greece, books III and IV; Greek philology and composition: Sophocles (Ajax, Oedipus Coloneus): Plato (Protagoras).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from Pindar and Theocritus.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.*—Cicero (Essays and Letters.) *Third Term*—Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*—Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.*—Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

The languages in this school are entirely optional and none of them required for any degree conferred by the University.

The instruction in this Department is given for the present by Professors Fiske, Rœhrig and Wilson, and is distributed as follows:

The Modern Persian is taught by Professor Fiske. There have already been several classes in this language and the Professor is ready to begin a new class whenever there are students desirous of pursuing it.

Professor Rœhrig gives the instruction in the living Asiatic Languages and in the Sanskrit, Old Persian and Arabic. Prof. Rœhrig commenced with an elémentary course in *Chinese*, which lasted two years. He then added instruction in *Japanese* (grammar, practical exercises in the Hiragana character, etc.) At the same time he delivered lectures to the students on *Mantchoos*, *Turkish*, the *Tartar Languages*, *Turanian Philology*, etc. A two years' course of Arabic followed, and finally Sanskrit has become one of the principal objects of this department.

The Professor also presents to his classes, in succession from year to year, grammatical outlines and philological sketches of such languages of the East, as may be most instructive and of particular interest to the student of ethnographical philology and general linguistic science.

Text books used, and course of Sanskrit studies.—Bopp's Grammar; Practical Exercises. Selections from the Hitopadesa; from the Mahabharata, and other Sanskrit works. Also occasionally, lectures on Sanskrit Literature, and on special subjects connected with Sanskrit Philology.

The Hebrew, Chaldee and Ancient Syriac are taught by Professor Wilson whenever there are classes desiring them.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the students the principles of grammar and the use of idioms, with a knowledge of pronunciation, so that, at the end of the course, each of them may be able to read any modern work, and to write with some degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term Otto's "French Grammar" is studied. This is completed in the second term, and translation is begun, and is continued through the third term. In the second year French plays are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar, "Il Vero Amico," comedy of Goldoni, and Manzoni's "Promessi Sposi."

Second Year.—Dante's "Inferno," selected stories from Boccaccio's "Decameron," and lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar in connection with exercises in writing; Padre Isla's translation of Le Sage's "Gil Blas," and Moratin's "El Si de las Niñas."

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year*,—(Second year in the Course in Science). Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. After the second year of German or the third year in the Course of Science, German is optional.

Third Year.—The reading consists of the first part of Goethe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyeson's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

VII. MATHEMATICS AND ASTRONOMY.

In this department there are two courses marked out, one or the

other of which is pursued wholly or in part by every student who is expecting to graduate in any course except Natural History.

The fuller course is designed especially for students in Architecture, Civil and Mechanical Engineering, and those whose professional pursuits are to be largely dependent on Mathematics. It is also designed to meet the wants of those who take the technical course in Mathematics or pursue the subject with special reference to preparing themselves for teachers.

The other course is designed for those who do not intend to pursue the subject any further than is required in the General Courses and in the Courses of Agriculture, and Chemistry and Physics.

FIRST OR FULLER COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Theory of equations and spherical trigonometry. *Third Term.*—Harmonoid geometry and geometrical conics.

SECOND YEAR.—*First Term.*—Analytical geometry. *Second Term.*—Analytical geometry of three dimensions and calculus begun. *Third Term.*—Calculus.

THIRD YEAR.—*First Term.*—Integral calculus. *Second Term.*—Theory of functions and calculus of variations. *Third Term.*—Differential equations.

FOURTH YEAR.—*First Term.*—Analytic and celestial mechanics. *Second and Third Terms.*—Philosophy of mathematics with reviews.

SECOND COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Solid geometry. *Third Term.*—Trigonometry and mensuration.

SECOND YEAR.—*First Term.*—Analytic geometry, plane and solid. *Second Term.*—Calculus and astronomy.

The whole of the first course is required in the Technical Course of Mathematics. It is required through the third term of the calculus ending with the first term of the third year in the Course of Civil and Mechanical Engineering, and through the second term of calculus ending with the third term of the Sophomore year, except the harmonoid geometry, in Architecture.

Any student in any of the courses who chooses to do so may take the mathematics of this course with the permission of the professor in charge of the department.

For post-graduates and special students other subjects are offered if they are desired, as quaternions, quantics and the theory of numbers.

In the latter portions of the fuller course and for post-graduate studies French and German text-books will be used.

Descriptive astronomy will form a part of each course.

Throughout the course in mathematics and in all the mathematical classes there will be frequent examinations during the term, besides the general term examination at the end of each term. These will often be given without notice, and extend to previous work. They will test the student's mastery of general principles and methods, quite as much as of details.

VIII. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial and Practical Mechanics were early established and filled. Models illustrating mechanical movements, and the various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the endowment of the Professorship of Mechanical Engineering and Machine Construction. This department has thus been placed in a condition to do its work in a most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine-shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

The instruction in shop-practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine-shops. The work consists in the production of standard tools of the highest excellence, and the building of machines from original designs. With the exception of the standard surface-

plates, gauges, etc., which are only produced to give the students a knowledge of flat, straight, square, and round, together with the correct methods of producing them, there is no one thing or class of things manufactured.

The work is always changing, and the relative kinds of work are proportional to that required in the production of new machinery. By this method it is believed that the students will learn not only the use of tools, but acquire experience also in the development of new designs.

In addition to the Full Course of four years which is given at length, under the heading "Courses of Study," an Optional Course has been laid out, subject to the direction of the Dean. For admission to this course entrance examinations in Grammar, Geography, Arithmetic, Algebra through Quadratics, Physiology, and Plane Geometry are required.

Attendance upon ten lectures or recitations per week, or their equivalent, in addition to two hours' daily shop-practice, two hours' daily drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

MILITARY SCIENCE.

By the Act of Congress creating the Land Grant on which the University is founded, and by the Act of the Legislature of the State of New York assigning that land grant to us, it is obligatory on the University to provide for instruction in Tactics and Military Science. In accordance with this, Drill and Military Science have been declared to be "a part of the studies and exercises in all courses of study and in the requirements of all students in the University."

The Course of Military Instruction and Drill, now prescribed, extends through the first and third terms of the first, second, and third years in the University, and the second term of the fourth year.

These exercises occur not more than three times a week during the first three years, and do not exceed one hour at a time. During the second term of the fourth year they occur but twice a week, and consist mostly of recitations and lectures in reference to the organization and command of a company and battalion.

The Trustees have authorized and instructed the Faculty to make such arrangements that any student may, *after his first year in the University*, substitute other studies and exercises for the Drill and Military Science thus generally required of him.

Under this resolution the Faculty have decided that two recitations a week, or their equivalent in lectures, laboratory work, or other special work in any of the technical courses, for the students of those courses respectively, shall be regarded as an equivalent for the Drill and Military Science for the terms during which they are due.

In order that any student may avail himself of this permission to substitute something else for the Drill and Military Exercises, it will be necessary that, at the time of obtaining his registration ticket for the term, he shall signify to the Registrar what he intends to offer as a substitute. If he neglects to do so he will be holden to the performance of his military duties for the term.

All students that take Drill must continue it through the term. They are required to provide themselves with the University uniform for drill and parade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe.

The object of the Drill and Military Instruction is not merely that knowledge of tactics and military evolutions that is required of the practical soldier. The practical military exercises are so ordered as to subserve the purposes of physical culture—an object of vital moment during the critical period of life usually comprised within university years. The fifteen recitations per week required of them are of such a character that most students find it as much as they can well do to prepare themselves for, and attend to them, while the Drill, requiring no extra study, will be no more than the amount of mere physical exercise which each student will find it necessary to take in some form or other.

The Military Exercises include:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable. (3.) *Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Any student who has satisfactorily performed all the duties thus required of him for the first three years, and who is qualified therefor, will be entitled to a commission, and for the performance of his duties as a commissioned officer during his fourth year he will be entitled to a credit of five recitations per week for one term, and, at his graduation, will receive, moreover, a certificate of military proficiency together with his appropriate Diploma.

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field

works; military mining; the attack and defense of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

X. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will afford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

1. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany; field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of systematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the princi-

ples involved in the natural system of classification. The prominent species of each order are also considered, especially those o' importance as agricultural, medical, economic, or ornamental plants, or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany.

The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany.

In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required.

In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

2. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

In this school a full course may be completed in the last six terms of the course in Natural History; but as this is designed especially for those intending to become professional geologists, ample provision has also been made for the needs of others by the establishment of shorter courses, both special and general.

The instruction given may be classified under three heads:

I. *Geology proper.*—Comprises the principles of general and theoretical geology, including physiography, geognosy, dynamical geology, stratigraphy and archæology. These subjects are taught by means of (1) a course of lectures in the spring term; (2) laboratory practice, consisting in the critical examination of rocks, the study and construction of geological maps, sections, models, etc., and the preparation of short theses upon special topics; (3) field practice, including also the methods of procedure in geological surveys and reconnoissances.

II. *Palæontology.*—In this department, a course of lectures on palæo-zoology is given to special students, in connection with

the study of fossils in the laboratory. Palæo-botany is also taught in a similar manner, the whole being supplemented by the thorough study of historical geology. Field work is required of all students, as in the other branches of the school.

III. *Economic Geology.*—Comprises the distribution and modes of occurrence of mineral deposits; the geological positions and relations of building stones, fictile materials, fossil fuels, light-producers, pigments and other natural accumulations applicable in the arts, as well as the relations of practical geology to agriculture, architecture, civil and mining engineering, sanitary science, etc. These topics are included in a course of lectures given in the winter term, and in the laboratory, special facilities are afforded for further progress to such persons as may desire it. In this way, engineers, architects, physicians and agriculturists may obtain a knowledge of the subject suited to their particular needs.

The lectures are designed to present outline views of the subjects treated, such as will serve as an introduction to higher geological studies, and afford a general idea of the science to those who have not the opportunity of extending their knowledge of it.

In the laboratory, the student is required to investigate for himself, without access to books until he is prepared to use them in the final stages of his studies. Work is systematically laid out by the teacher at each step, and the rate of progress is determined by the ability and faithfulness of the student.

Whenever practicable, extended excursions are made with the classes, and local field work is frequent in suitable weather.

Professor Comstock is now engaged in a geological survey of the hydrographic basin of Cayuga Lake, a district which presents problems of the highest interest in physical geology. Qualified students will assist in this undertaking, receiving full credit for their work.

Courses of study and practice for post-graduate students provide for advanced work in geology or palæontology to any extent that may be desired. The surface geology of this region is remarkable and the rocks of the vicinity are exceedingly rich in fossils of the Devonian age.

3. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3) A course of thirty-five lectures on psychology and æsthetics, by Professor Wilson. In the Winter Term, (1) A course of thirty lectures on general zoology, by Professor Wilder, and (2) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3) A course of fifty lectures upon veterinary medicine

and surgery, by Professor Law. In the Spring Term, (1.) A course of twenty lectures upon comparative anatomy, by Professor Wilder. (2.) A course on economic entomology, by Instructor Comstock. (3.) Lectures on the natural history of man, forming a part of a course in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians are required to dissect, first, the common animals, then monkeys, and afterward human subjects, when they can be procured. Special attention is given to the animals inhabiting Cayuga Lake and the vicinity of Ithaca. Instruction is given in the methods of collecting, preserving and arranging anatomical and zoological specimens.

Books of Reference.—Students are at liberty to select from the following list of works for reading upon the subjects treated of in the lectures:—Flint's "Physiology of Man;" Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's "Physiology and Hygiene." In comparative anatomy—Owen, Huxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies —Wyman ("Symmetry and Homology in Limbs"), Wilder ("Intermembral Homologies.") In zoology—Agassiz ("Essay on Classification." or "Methods of Study in Natural History"), with Tenney ("Manual of Zoology") or Milne-Edwards ("Elements of Zoology"). In economic entomology and ornithology—Packard, Samuels, the New York State Reports, and Riley's Reports on Entomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily pursued a partial or special course, there will be given a certificate, stating the time he has spent, the studies pursued, and his degree of excellence therein. It will be signed by the President of the University and the Dean of the Faculty. A student who has completed the full course of four years, will be recommended for the degree of BACHELOR OF SCIENCE.

XI. PHILOSOPHY AND LETTERS.

I. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge.

Spring Term.— Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

FOURTH YEAR.—*First Term.*—The History of Philosophy, and the progress of knowledge from its beginning in Greece to the

present day, with criticisms on the methods of philosophy and transcendental logic.

Second Term.—Moral philosophy theories or morals and the development of moral sentiments. For the present Moral Philosophy and Political Economy alternate with each other, each subject being treated only once in two years. The Junior and Senior classes are united in their attendance on these lectures.

During the Winter term of the Senior year there is also a course of lectures on the Philosophy of History. And in the third term ot that year a course of lectures is delivered on Law and Jurisprudence, including the three branches, Constitutional, International, and Municipal Law.

2. SCHOOL OF LETTERS.

The study of the English language and literature, including the explanation and illustration of the structure, growth and peculiarities of the language, is incorporated into each of the General Courses.

The School embraces two departments, one of Anglo-Saxon and English Literature, and the other of Rhetoric and General Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, and embraces the following schedule of exercises and lectures:—

In the course in Science:—

No instructions are given by the Professor in this department, until the beginning of the third year.

THIRD YEAR.—*First Term.*—Lectures on the English language and literature, from Chaucer to Milton, inclusive. *Second Term.*—Lectures on the English language and literature, from Dryden to Cowper, inclusive. *Third Term.*—Lectures on English and American literature of the nineteenth century. A Syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric. *Third Term.*—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum,

Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

II. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and for the first year the instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

During the second year the exercises in writing and composition are continued; the subjects varying with the advance of the student.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; to extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also have exercises in lecturing on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR.—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

SECOND YEAR.—Essays with readings in the class and criticism of composition and style.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions; readings from Shakespeare and Burke. *Second Term.*—Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose; orations, essays, and discussions.

Letters of inquiry for further information in regard to special departments of the University may be addressed to the head of the department concerning which the inquiry is made.

MEANS AND FACILITIES FOR EDUCATION.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls are devoted to lecture-rooms. The other halls contain rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING, are the offices of the President, the Treasurer, and the Registrar of the University, and the Faculty Room.

In the NORTH BUILDING is the Hall of the University Literary Societies, where the Young Men's Christian Association also hold their meetings. It contains, moreover, fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE MC GRAW BUILDING.

This building, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone, quarried on the University grounds, but with dressings and cornices of Onondaga gray limestone. In its architecture it corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter containing three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and in the galleries on the second floor are the various museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath

this are the rooms at present occupied by the Department of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University, the nine smaller bells of the McGraw chimes and the great University clock. The interior of the McGraw building is solidly finished with native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professor of Industrial Mechanics, and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE FOR WOMEN.

This is the gift of Honorable Henry W. Sage. It is not a separate department or school, but merely a home or dormitory for women students. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will

accommodate about one hundred pupils. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE SAGE CHAPEL.

This Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require; and in fact they are so used on all occasions when the University Sermons spoken of above—under the head of religious instruction, are delivered.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above the town. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream, and enter the University campus on the south side.

II. LABORATORIES.

1. THE ANATOMICAL LABORATORY.

The Anatomical Laboratory is in the second story of the McGraw building, adjoining the Museum and lecture-room. In the laboratory are all of the alcoholic collections. Among these are specimens and dissections of the *fishes of Cayuga Lake;* a series of *embryos*, especially of mammals; a series of *brains* of all classes of vertebrates; Brazilian fishes, reptiles and mammals. A large lot of *amphioxus* has lately been received from Italy, and each special student will be enabled to dissect one or more specimens of this, the lowest known vertebrate animal.

2. THE CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in GENERAL Chemistry, and a smaller one for the class in AGRICULTURAL Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors. and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunsön filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

3. THE ENTOMOLOGICAL LABORATORY.

The Entomological Laboratory is in the McGraw Building and on the same floor as the Anatomical Laboratory. In it is the collection in Entomology, and the work in this Laboratory is under the guidance of a special instructor. Among its collections are a series illustrating the entire life-history of injurious insects, their transformation, food, parasites, etc.

4. THE GEOLOGICAL LABORATORY.

The Geological Laboratory is in the south wing of the McGraw Building, second story, adjacent to the Geological Museum. It is furnished with tables and means for laboratory work, a very complete collection of specimens and books for reference; there are also a large number of photographs, illustrating geological phenomena, from the Hayden expedition and the Pacific Coast surveys, and other sources.

5. THE MECHANICAL LABORATORY.

The Mechanical Laboratory, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, and a grinding

machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard guages in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam-engine in case of accident to the water power.

6. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but good practical provision for this work has been made. The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illustrative experiments. Several rooms in the South Building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarized light, and photometry. In the Chemical Laboratory Building, a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern-slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Dubosoq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet and a Gramme electro-magnetic machine, made at the University work-shop.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

7. THE DRAUGHTING ROOMS.

There are four Draughting Rooms, fitted up with tables, models, and whatever is needed for the work to be done in them. (1.) The Architectural Draughting Room, in the north wing of the McGraw Building, under the direction of Professor Babcock. (2.) The Engineering Draughting Room, in the north wing of the Chemical Building, under the direction of Professor Fuertes. (3.) The Mechanical Draughting Room, in the Sibley College, under the direction of Professor Morris. (4.) The Free-hand Drawing Room, occupying the third story of the Sibley College, under the direction of Assistant Professor Cleaves.

8. THE GENERAL FARM.

The University farm consists of about 100 acres, exclusive of the experimental farm, the campus, and timber land. A large proportion of this is devoted to the raising of food for the domestic animals. In addition to the animals kept for labor and the production of milk, are a few specimens of the leading breeds of cattle, sheep, and swine, the primary object of which, is class illustration. The object of the system pursued consists in raising to the highest standard the condition of the soil and its productive power. But it is evident that this can be accomplished only by a well defined system of rotation, and years of careful and judicious management.

It is further evident that the high price of labor and of fertilizers are the principal obstacles to be overcome in advanced agriculture. By the more extended use of labor-saving implements and the horse in the operations now so often performed by hand, supplemented by the liberal application of fertilizers and clover, we are sanguine that it may be conducted within the limits of economical labor. The general farm is made supplementary to the experimental, by duplicating the experiments of the latter but on a larger scale.

The statistics of the general farm as well as the experiments are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

The old barns near the University buildings have been repaired and adapted to general farm purposes. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and illustration the best tools of their kind that the market affords.

9. THE EXPERIMENTAL FARM.

Forty acres of the general farm are used in conducting experiments in the rotation of crops, the various modes of cultivation, the value and application of domestic and imported fertilizers, the hardiness, productiveness, and value of the various grains and grasses, and in originating and testing new varieties. To aid in conducting these experiments, a new and commodious barn has been erected, and adapted for that purpose; it will aid for experimentation in feeding domestic animals. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five thousand square feet, is divided into box-feeding stalls, sheep pen,

horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

III. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work and in various languages. From it have been issued the UNIVERSITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

The facilities of the printing office have been increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting, will be provided with work and the means of further instruction.

IV. THE UNIVERSITY LIBRARY.

The University Library contains about forty thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRA-

RY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelley, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible; the first one—Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

V. THE READING ROOM.

The Library is open and accessible to all registered students every week day from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:—

American.—American Journal of Science; Atlantic Monthly; Canadian Monthly; Country Gentleman; The Nation; Monthly Report of the Department of Agriculture; New York Medical Jour-

nal; North American Review; Harper's Magazine; Historical Magazine; Horticulturist; Journal of the Franklin Institute; Official Gazette of the Patent Office; Prairie Farmer; Railroad Gazette; Railway Review; Specifications of Patents; American Bibliopolist; Cornell Review; Journal of the Telegraph; Journal of Social Science; Medical Eclectic; Penn Monthly; Popular Science Monthly; Publisher's Weekly; Unitarian Review.

English.—Academy; Anthropological Review; Athenæum; Blackwood's Magazine; Bookseller; Builder; Chemical News; Edinburgh Review; Engineer; Examiner; Frazer's Magazine; Guardian; Illustrated News; Journal of the Geological Society; Journal of Microscopical Science; Journal of the Royal Agricultural Society; Mechanics' Magazine; North British Review; Notes and Queries; Pharmaceutical Journal; Philological Society's Proceedings; Popular Science Review; Quarterly Journal of Science; Quarterly Review; Saturday Review; Spectator; Veterinarian; Westminster Review.

French.—Annales de Chimie; Annales des Mines; Annales des Ponts and Chausées; Bibliographie de la France; Bulletin du Bibliophile; Bulletin de la Société chimique; Comtes Rendus; Illustration; Journal de l'Agriculture; Journal de l'Anatomie; Journal de Mathématique; Journal de Menuisérie; Nouvelles Annales de Mathématique; Recueil de Médecine Vétérinaire; Revue des deux Mondes; Revue de l'Architecture; Revue politique et littéraire; Revue scientifique; Revue de Zoölogie.

German.—Annalen der Chemie und Pharmacie; Annalen der Physik; Archäologische Zeitung; Archiv für Anatomie; Archiv für das Studium der neuren Sprachen; Chemisches Centralblatt; Fortschritt der Physik; Hermes; Historische Zeitschrift; Illustrirte Zeitung; Im neuen Reich; Archiv für mikroskopische Anatomie; Archiv für pathologische Anatomie; Bauzeitung; Beiträge für Sprachforschung; Bericht der deutschen Chemischen Gesellschaft; Literarischer Wochenbericht; Milch Zeitung; Palæontographica; Petermann's Mittheilungen; Philologus; Polytechnisches Journal; Jahrbuch für wissenschaftliche Botanik; Jahresbericht für Chemie; Journal für praktische Chemie; Journal für Mathematik; Landwirthschaftliche Versuchs-Stationen; Landwirthschaftliches Centralblatt; Literarisches Centralblatt; Repertorium der Thierheilkunde; Repertorium für Experimental Physik; Rheinisches Museum; Zeitschrift der morgenländischen Gesellschaft; Zeitschrift für analytische Chemie; Zeitschrift für bildende Kunst; Zeitschrift für Sprachforschung; Germania vierteljahrsschrift für deutsche Alterthumskunde; Jahrbuch für Romanische und Englishe Sprache und Literatur; Jahresbericht über die Fortschritte der classischen Alterthumswissenschaft; Journal für die reine und angewandte Mathematik; Mittheilungen über wichtige neue Erforchungen; Zeitschrift für Bauwesen; Zeitschrift für Volkerpsychologie.

VI. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Frères Chrétien, of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern-slides to be used in the camera as illustrating various remarkable buildings and the various styles of architecture.

The architectural department in the University Library is particularly full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modèles Clastiques* of plants, on a magnified scale, by Auzoux, of Paris, and plant models designed and executed by Brendel, of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil

by Professors Prentiss and Hartt and Mr. Derby: (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh; (5) A small collection of economic vegetable products.

4. GEOLOGY AND PALÆONTOLOGY.

This Museum comprises:—(1) The JEWETT COLLECTION, embracing a large number of species of fossils, mainly from the New York formations, many of which are illustrated by type-specimens figured and described in the reports of the New York State Geological Survey; (2) A series of rocks and fossils of the Devonian Age to illustrate the geology of Ithaca and vicinity; (3) The HARTT COLLECTION (deposited) of rocks and fossils from the British Provinces and Brazil; (4) The collections of rocks and fossils made by Professor Hartt and his parties on the two Morgan expeditions to the Amazonas in 1870 and 1871; (5) The WARD COLLECTION of casts of fossils, presented by Mr. Cornell: (6) Several miscellaneous collections of ores, rocks and fossils obtained through gift, purchase or exchange; (7) A collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard on the Amazonas in 1870 and 1871; (8) A number of skeletons from the Anglo-Saxon Cemetery at Frilford, England, with a variety of ethnological relics from the same place, the whole presented by Professor George Rolleston, of the University of Oxford; (9) A valuable collection of ancient Peruvian pottery, presented to the Museum by President White; (10) The T. B. COMSTOCK COLLECTION (deposited), of rocks, fossils and minerals, including a quantity of hot spring and geyser deposits from the Yellowstone National Park, with volcanic rocks and other material collected by Professor Comstock, while acting as the geologist of the N. W. Wyoming expedition, in 1873; (11) The SIMONDS COLLECTION (deposited), made up of fossils from the Cayuga Lake Basin, especially from the Hamilton and Chemung groups, and containing many forms as yet undescribed; (12) Several hundred lantern-slides to illustrate the lectures on geology, palæontology and archæology; (13) A number of large photographs illustrating the geology, etc., of the Rocky Mountains and the Pacific Coast, taken on the Hayden Survey and the U. S. Coast Survey; (14) The W. A. JONES COLLECTION (deposited), comprising a choice selection of fossils and minerals from N. W. Wyoming and elsewhere, collected by Captain Jones of the U. S. Engineer corps.

5. MINERALOGY.

The SILLIMAN COLLECTION of minerals, formerly the private collection of the late Benjamin Silliman, is located in the main hall of the McGraw building and contains many valuable specimens. There is also a small but constantly increasing working collection

of minerals situated in the Chemical Laboratory which is used more especially by the students in determinative mineralogy and blow-pipe analysis.

6. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art at the present time, as well as a collection of curious things pertaining to the department, is being made and will comprise arms of various patterns, shot, shell, and the various kinds of ammunition in use in the army of the United States. It is believed that the student being familiarized with the different articles and their nomenclature, will be enabled to comprehend much better the technical statements of military history; and if his services are required by the national government this information will be of advantage.

7. TECHNOLOGY.

Besides the models made at the University, the Museum of Technology and Civil Engineering comprises:—(1) A collection of working models in brass and iron, illustrative of mechanical principles applied to machinery, and an extended series of photographs for the same purpose, from the establishment of Schröder, of Darmstadt; (2) Another collection of working models in wood and iron, illustrative of intricate mechanical combinations and expedients, made under the direction of Professor Willis, of Cambridge, England, and Professor Rigg, of the College of Mechanics, at Chester; (3) Models illustrative of descriptive geometry, and bridge and roof construction, made by Schröder; (4) The diagrams and charts issued with the sanction of the English Committee of Council on Education; (5) Photographs and models from various sources; (6) A collection of engineering instruments.

8. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoology, which are available for the educational purposes of the University, are made up of the following:—(1) THE GREENE SMITH ORNITHOLOGICAL CABINET, a mounted and classified collection of 362 birds, principally American, made and presented to the University by Mr. Greene Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL COLLECTION, including about twenty-five thousand species; (3) The *Modèles Clastiques* of Dr. Auzoux, of Paris, illustrative of comparative anatomy and physiology; (4) The lithographic charts and diagrams edited by Achille Comte of Paris, and those published under the auspices of the Council of Education at London; (5) A constantly increasing collection of native animals in alcohol, and of preparations illustrating their structure; (6) A collection of insects to which additions are constantly made, specially intended

to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoological specimens deposited by Professors Wilder and Hartt.

VII. COLLECTIONS IN THE FINE ARTS.

The foundation of a Museum of the Fine Arts has heen laid by depositing in the University, for the use of the Faculty and undergraduates, the following: (1) A valuable collection of Photographs, especially rich in illustrations of architecture and of art applied to manufactures; (2) Paintings in oil, including full length portraits of Professor Goldwin Smith and George William Curtis, by Carpenter, presented by President White; with portraits of Humboldt, Hon. Hiram Sibley, Peter Cooper, and Prudence Crandall; (3) Bronze copies of masterpieces of statuary, including three of Michael Angelo's works, two busts by Burton, one of President White, a gift of some friends of the President, and the other of Professor Wilson, a gift of the Students of the University, a bust of Vice-President Russell by Miss Abbot, and an original bust of Lincoln; (4) Many portfolios of engravings illustrative of Christian art, and of the history of art in general, including the publications of the Arundel Society and the Berlin Museum series, as well as the series of heliotype reproductions of the Gray collection.

There is also quite a collection of busts of distinguished men of Classic, Gothic, Renaissance and Modern Sculpture, and architectural ornamentation, made under the direction of the South Kensington Museum, and by Brucciana of London, arranged for the use of students in Free-hand Drawing, and for the departments of Architecture and Engineering.

VIII. UNDERGRADUATE SOCIETIES.

The following associations have been formed by the undergraduates:—(1) A Natural History Society; (2) A Chemical Club; (3) An Agricultural Club; (4) An Engineering Club; (5) A Society for Mechanical Engineering; (6) Four literary societies, known as the "Irving," the "Philaletheian," the "Adelphi," and the "Curtis;" and (7) a "Christian Association," meeting Thursday evenings and on Sunday afternoons.

ADMISSION AND GRADUATION.

ENTRANCE EXAMINATIONS.

Candidates for admission must be of good moral character and at least sixteen years of age, and if women, seventeen.

1. All Optional students, and students for the Courses in Agriculture and the Mechanic Arts will be required to pass thoroughly satisfactory examinations in the following subjects:—(1) Geography, political and physical. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic, including the metric system. (4) Physiology. (5) Plane Geometry, and (6) Algebra through Quadratic Equations, including Radicals.

Regents' *Certificates* issued by the Regents of the State of New York will be accepted instead of entrance examinations in Arithmetic, Geography, and English Grammar.

Certificates issued by the Superintendent of Public Instruction of the State of New York, Diplomas issued by the State Normal Schools, and by the Academies and High Schools of the State of New York whose requirements for graduation are approved by the Faculty and whose course of study requires Physiology and Plane Geometry, will be accepted instead of an entrance examination in all the subjects above named except Algebra.

Graduates of Academies and High Schools of the State of New York *who have taken Diplomas* issued by the Regents of the State of New York will be admitted to the University as optional students and as students in the Courses of Agriculture and the Mechanic Arts without examination, on the presentation of their diplomas.

2. For admission to the courses in Architecture, Civil Engineering, and Mathematics, besides what is mentioned above, an examination will be required in Solid Geometry, and Plane Trigonometry (those books preferred in which the trigonometric functions are treated as ratios), including the theory and use of Logarithms.

3. Of all candidates for admission to the courses in Science, Science and Letters, Literature, Philosophy, Mathematics, Natural History, and Chemistry and Physics, examinations will be required, besides those named in the first paragraph above, either in (1) the

principles of French Grammar, the translation of English into French, and of three books of Voltaire's Charles XII, or its equivalent; or (2) the principles of German Grammar, the translation of English into German (Whitney's or Comfort's German Grammar preferred), and seventy-five pages of Whitney's Reader or its equivalent; or (except for the course in Mathematics), (3) Algebra entire (*any of the larger ones*), Solid Geometry, and Trigonometry, Plane and Spherical.

Students who wish to enter any one of the above named courses and are not prepared with the French, the German, or the extra mathematics, can enter as optional students and make up these deficiencies by reciting with the classes in the University.

4. For the Course in Natural History, candidates will be examined also in Plane Trigonometry; Allen's Latin Reader, or some equivalent for it, with an adequate amount of grammatical knowledge; and in Greek, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

5. For the Course in Literature and that in Philosophy, besides the general entrance examinations and the French or German, they will be examined in Latin Grammar, including prosody; Composition (Arnold's first twelve chapters); four books of Cæsar or Sallust's Catiline, eight orations of Cicero, or five orations and the *de Senectute*, Virgil's Eclogues, and six books of the Æneid.

6. For the Course in Arts, or the Classical Course, the examinations will be the same as for Optional Students, Latin the same as for the Course in Literature, with the addition of an examination in Greek; Greek Grammar (Goodwin's); writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; and the History of Greece.

7. Special Students will be admitted to the University without examination, to any of the Departments in which either laboratory work or drafting is required, by a vote of the Faculty, on the recommendation of the Professor in charge of the Department. Such students must be at least eighteen years of age, and must have some attainments in the subject they propose to pursue; they must devote at least fifteen hours a week to the work of the Department which they have entered, and must renew their application for admission to the Department at the end of each year.

The character of the examinations is sufficiently indicated by the Examination Papers which are given as specimens below, pp. 105 etc.

DIRECTIONS FOR ADMISSION.

The candidate will first apply to the Registrar, at South University Building.

1. In case he come from another college or university, with the "Dismissal" above described, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

2. But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations.

The Entrance Examinations will be held on the days indicated in the calendar on the 7th page of the Register.

For all examinations, except that in June, beginning the Monday before Commencement, the appointments are as follows;

On Tuesday, beginning at 10 o'clock, a. m., arithmetic, algebra and plane geometry, with a recess from 1 to 2.30 p. m.

On the second day, Physiology at 8 a. m., geography at 10 a. m., and English Grammar and Orthography 2.30 p. m.

On the third day beginning at 9 a. m., French, German, Greek, and Solid Geometry; at 2.30 p. m., Latin and Plane Trigonometry.

No examinations for the admission of students will be held after those at the beginning of the second term until those in June, just before Commencement, which will begin on Monday, 9 a. m.

Candidates for admission should be here on the day set and at the hour named for the beginning of the examinations, as each examination is complete by itself, and will not be repeated until the beginning of the next term, except in cases where very urgent reasons have prevented the student being present at the regular entrance examinations.

After his examination he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing all the examinations required, and showing to the professor his registration ticket.

In case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examinations, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *No optional or other course will be possible* without some advance beyond the mere entrance examination.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities, must present certificates of honorable dismission *after having passed at least one term's examinations.* They will, on such a testimonial, coming from any college or university whose requirements for admission are equivalent to our own, be admitted to the

University without further examinations. The testimonial must certify to both good character and good scholarship.

Such a dismissal will admit the applicant to the University as *an optional student*, or to the Courses in Agriculture and the Mechanic Arts without further examination.

But if the applicant wishes to enter any one of the Courses that requires for admission anything more than the six subjects named, 1, p. 78, he must pass the additional examinations required for admission to the Course.

And in case he wants to be admitted to an advanced class in any subject, he must apply to the professor in charge of the department whose class he proposes to enter, and undergo such examinations as he may require.

ADMISSION TO AN ADVANCED STANDING.

Students who have prepared themselves for an advanced standing in the University, at academies or public schools, without having entered any other college or university, will be required to pass the entrance examinations. They will then be in the same relation to the classes as those that have come from other colleges.

Such students are *in no case* admitted at *once* to any advanced standing as Sophomore, Junior or Senior.

The class distinctions indicated by those names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of this University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need to prepare themselves for graduation here, without regard to the class distinctions above alluded to.

After having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, such students may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to,—the Faculty by this act accepting their studies elsewhere as equivalent to what they would have done here if they had entered the University at the beginning of their collegiate course.

TIME REQUIRED FOR GRADUATION.

No student will be permitted to graduate who has not pursued the studies of his course for four entire years in this University; except those who, having pursued part of the studies of their course before coming here, propose to enter at an advanced standing. But in order to do so they must pass up, before the close of their first year, in all the studies that have been pursued by the class they intend to enter. And students who, by sickness or absence on leave, have lost a part of their time will be allowed in

some cases to take more than the regular studies of their course by asking permission of the Faculty at the beginning of each term. Otherwise no extra studies will be taken into account in considering the qualifications for graduation.

Students who fail at any examination must take the study over again; those who are conditioned must make up their condition at the first ensuing examination on the same subject, and any professor may exclude from his class any student who, after having had one opportunity to do so, shall have failed to remove his condition.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate degree in this University, or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations, or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular professor or special faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

A schedule of the lectures and exercises for each term is issued at the beginning of the term.

The day next preceding that on which instruction begins is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

The beginning and end of all lectures and recitations are determined by the ringing of the great bell in the McGraw tower. Lectures and class exercises commence at 8 A. M. and continue until 1 P. M. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term, To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

Reports of all examinations are made and a record of them is kept by the Registrar. A Course Book also has been provided which the students may procure and in which they may have an entry made, term by term, indicating the grade at which they passed their examination. Any student may ascertain on making application to the Registrar whether he has passed his examinations or not.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is required for continuance in the University, or a marked proficiency in some one of the more general departments of study, And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one or more terms in the University as a registered student, taking such studies as the Faculty may require. And all Diplomas will be dated from the time when they are granted.

COMMENCEMENT THESES.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere boys, assuming no farther control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory

practice, each week, and for the term in which Drill is required, either the Drill or two hours of extra study, and that no student is allowed to take an optional course that is not approved by the Faculty as worthy of his time and efforts.

Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without leave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty.

Any student found guilty of intoxication or other gross immorality will be at once dismissed.

And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to re-enter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred on all those students who satisfactorily complete any one of the five courses: Science, Science and Letters; Chemistry and Physics, Mathematics, or Natural History. And the particular course pursued by the student is specified in the Diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are given to the students who satisfactorily complete the courses corresponding to the degree named. The degree of Bachelor of Veternary Science is also given to students who complete a full course of four years in that department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the course leading to it in precisely the same order as it is laid down in the statement of courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register. But very few of those who attempt an optional course succeed in graduating in any course.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are offered.

A fee of five dollars is charged in all cases for Baccalaureate degrees, which must be paid before the diploma will be given.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out in the following General Departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any student intending to take a second or advanced degree should apply to the Faculty to be admitted a candidate for the degree he wishes to take, and signify the department in which he wishes to prepare himself for the degree.

MASTER'S Degrees in Arts, Literature and Science, will be conferred on those who have taken the Bachelor's degree in this University or elsewhere, where the requirements for those degrees respectively are equal to our own, on the following conditions:

1. After having spent at least one year in this University in a course of post-graduate study marked out by the Faculty in each case, presented a satisfactory thesis and passed a satisfactory examination at the University in the course of study pursued.

2. The same degrees will be conferred without residence on graduates of this University only, on conditions the same in all respects as above, except that the degree will not be given until three years after the Baccalaureate Degree has been taken.

The degree of MASTER OF SCIENCE will be conferred on those who have graduated in the Course in Philosophy on the same conditions as upon those who have graduated in the Course in Science.

The degree of CIVIL ENGINEERING is conferred upon such Bachelors of Civil Engineering as, after six terms or two years of additional study and practice, shall have passed the requisite examinations in the School of Engineering.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of Bachelor of Veterinary Science and who shall have passed satisfactory examinations therefor.

The degree of DOCTOR OF PHILOSOPHY will be conferred on graduates of this University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to our own on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required here for graduation in the Course in Philosophy, a knowledge of Greek equal to that required here for admission to the Course in Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

3. He must pass an examination upon the course marked out and present a meritorious thesis upon some subject included in the course of study.

The degree of DOCTOR OF SCIENCE will be conferred on graduates of this University, and other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have

(*a*) A knowledge of Latin and Greek at least equal to that now required for admission here to the Course in Natural History.

(*b*) A knowledge of French and German equal to that required here for graduation in the Course in Science.

(*c*) A knowledge of science, of literature and of philosophy equal to that required here for graduation in the Course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Every successful candidate for any advanced degree will be required to pay to the Treasurer ten dollars before receiving his diploma.

They will also be required, in the case of the Doctor's degrees, to print their theses and deposit fifty copies in the Library of the University before receiving their diplomas.

In all other cases of second degrees the successful candidate will be required to deposit a copy of his thesis in the University Library.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Candidates for any second degree are required to make their applications for examination and present their theses at least twenty days before the annual Commencement at which they propose to take their degree.

A committee consisting of four members of the Faculty will superintend the examinations, which will take place during the second week previous to Commencement week.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates or certificates of proficiency, are conferred upon students who have pursued a special course in any branch of knowledge. They are given upon the recommendation of the respective Faculties.

PAYMENTS TO THE UNIVERSITY.

Free tuition is given:

1. To all State students appointed as described on p. 35.
2. To all resident graduates of this University and graduates of other colleges and universities whose requirements for graduation are equal to our own.
3. In order to encourage the study of Agriculture and the sciences more immediately related to it, the Trustees decided to give free tuition to all students in Agriculture; and in 1877, at the expiration of the first period, they voted to extend the same favor to that class of students for three years more. Under this rule free tuition is given to agricultural students who are pursuing either the three or the four years course and *intending to complete* the course.

For all others the tuition fees are twenty-five dollars a term.

There is also a charge of five dollars as a graduation fee which must be paid by each student before taking any Baccalaureate Diploma, and the same sum for any second degree.

No matriculation or entrance fees are required, nor is any discrimination made between students coming from other States.

The fees for instruction must be paid in advance, at the beginning of each term.

All students are, moreover, held responsible for any injury done by them to the property of the Institution.

Each student intending to take laboratory practice in Chemistry must deposit with the Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

EXPENSES OF RESIDENCE.

The following is an approximate estimate of the yearly expenses:—

Fees for instruction, $25 a term, - - - - - -	$ 75.00
Room, board, lights and fuel, about - - - -	240.00
Total, - - - - - - -	$315.00

Cascadilla Place, formerly kept by the University as a boarding-house for professors and students, is now rented to be kept for the same purpose. It is convenient to the University, and board with rooms, fuel, etc., can be had in it at an expense of from five to seven dollars per week.

The Sage College is open as a dormitory and boarding-house

for women students only. The cost for board, room rent, fuel and lights, varies from $5.50 to $7.50 per week. The rooms are all furnished and carpeted. Students occupying one of the most desirable rooms alone, pay $7.50 per week. If two occupy such rooms together, the price is $6.25. Those occupying less desirable rooms, with two in a room, pay $5.50 each per week. The entire building is warmed by steam, and in most rooms the sleeping apartments are separate from the ordinary studying room. Washing will be done in the building at the usual rates of charge for such work.

Other items will vary with the student's disposition and habits. Text-books and stationery cost from $20 to $30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

COURSES OF STUDY.

The courses of study are arranged in four classes: (1.) those aiming at general culture; (2) those aiming at special culture in some departments; (3) technical courses or those that are designed to prepare the students for some kind of practical work; (4.) partial courses leading to no degree.

In stating the courses the figures in parentheses ( ) indicate the number of recitations or lectures per week, and studies named in *italics* are optional, and those with an "*or*" between them are equivalents for each other.

In computing Laboratory Practice two hours and a half of actual work are regarded as equal to one recitation.

In Draughting and Shop Work three hours of actual work are required as the equivalent of one recitation.

I. GENERAL COURSES.

1. The Course in Arts.

Leading to the Degree of Bachelor of Arts.

FIRST OR FRESHMAN YEAR.

First Term.—Greek (4); Latin (4); algebra (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Greek (4); Latin (4); solid geometry (5); rhetoric and composition (2).

Third Term.—Greek (4); Latin (4); trigonometry and mensuration (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Greek (4); Latin (4); exercises in rhetoric (1); *physiology, French, German, mathematics, chemistry, experimental mechanics* (6).

Second Term.—Greek (4); Latin (4); exercises in rhetoric (1); *zoology, French, German, mathematics, chemistry, electricity and magnetism* (6).

Third Term.—Greek (4); Latin (4); exercises in rhetoric (1); *botany, modern languages, mathematics, chemistry, electricity and magnetism* (6).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); essays (1); *Greek, Latin, modern languages, English literature, Roman history, mathematics, heat, geology* (12).

Second Term.—Political economy (2); essays (1); *Greek, Latin, modern languages, English literature, mathematics, astronomy, acoustics and optics, history of Roman empire* (12).

Third Term.—Logic (3); essays and criticism (1); *Greek, Latin, modern languages, English literature, mediæval history, mathematics, acoustics and optics* (11).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); general literature (3); *Greek, Latin, modern languages, pure mathematics, applied mathematics* (10).

Second Term.—Moral philosophy (2): general literature and modern oratory (3); *Greek, Latin, modern languages, special literature, history, pure mathematics, applied mathematics* (10).

Third Term.—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors; *Greek, Latin, history, modern languages, pure mathematics, applied mathematics* (10).

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

2. The Course in Literature.

Leading to the Degree of Bachelor of Literature.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); physiology (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Geometry (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4); botany (3); Anglo-Saxon (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5) and French (3), *or* French (5) and German (3); Anglo-Saxon (3); Latin (4); exercises in rhetoric and composition (1).

Second Term.—German (5) and French (3), *or* French (5) and German (3); early English (3); Latin (4); exercises in rhetoric and composition (1).

Third Term.—German (5) and French (3), *or* French (5) and German (3); Latin (4); early English (2); rhetorical exercises and composition (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (5); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman empire (5); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history (5); Latin, modern languages *or* science (4); special literature (2); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Second Term.—American history (2); philosophy of history (3); political economy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Third Term.—American law (5); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4); attendance on lectures of non-resident professors and preparation for Commencement.

3. The Course in Philosophy.

Leading to the Degree of Bachelor of Philosophy.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); Latin (4); French *or* German (5); rhetoric and composition (2); six lectures on hygiene, beginning the first Monday in the term.

Second Term.—Geometry (5); Latin (4); French *or* German (5); rhetoric and composition (2).

Third Term.—Trigonometry (5); Latin (4); French *or* German (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—German *or* French (3); physiology (3); astronomy (5); experimental mechanics (3); exercises in rhetoric (1).

Second Term.—German *or* French (3); zoology (3); analytical geometry (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1),

Third Term.—German *or* French (3); botany (3); electricity and magnetism (2); chemical lectures (3); calculus *or* laboratory practice (4); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history, science *or* languages (5); chemistry (2); geology (3): heat (2); essays (1); English literature (1).

Second Term.—Moral philosophy (2); history of the Roman empire, science *or* languages (6); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Logic (3); mediæval history, science *or* languages (8); acoustics and optics (3); essays (1); English literature (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law (5); general literature and oratory (3); *optional* (5); attendance on lectures of non-resident professors and preparation for Commencement.

4. THE COURSE IN SCIENCE AND LETTERS.

Leading to the Degree of Bachelor of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning the first Monday in the term.

Second Term.—Geometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); astronomy (5); rhetorical exercises (1); science *or* modern languages (3).

Second Term.—French *or* German (3); zoology (3); chemistry (3); rhetorical exercises (1); analytical geometry *or* science and modern languages (5).
Third Term.—French *or* German (3); botany (3); chemistry (3); rhetorical exercises (1); calculus *or* modern languages and science (5).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (5); geology (3); physics (3); English literature (1); essays (1).
Second Term.—Moral philosophy (2); history of the Roman empire (5); physics (3); English literature (1); essays (1); *optional* (3).
Third Term.—Logic (3); mediæval history (5); physics (2); English literature (1); essays (1); *optional* (3).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).
Second Term.—American history (2); philosophy of history (3); political economy (2); general literature and oratory (3); *optional* (5).
Third Term.—American law and polity (5); general literature and oratory (3); *optional* (5).

The hours marked optional may be filled with any science, mathematics, modern languages or literature, for which the student is prepared by previous study.

II. SPECIAL COURSES.

Leading to the Degree of Bachelor of Science.

1. THE COURSE IN SCIENCE.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.
Second Term.—Solid geometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).
Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); astronomy (5); experimental mechanics (3); rhetorical exercises (1).

Second Term.—French *or* German (3); zoology (3); analytical geometry (5); electricity and magnetism (2); chemistry (3); rhetorical exercises (1).

Third Term.—French *or* German (3); botany (3); electricity and magnetism (2); chemical lectures (3); calculus *or* laboratory practice (5); rhetorical exercises (1).

THIRD OR JUNIOR YEAR.

First Term.—Heat (2); chemistry (2); geology (3); English literature (1); essays (1); *optional*, six hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* or *zoology*.

Second Term.—Acoustics and optics (3); geology (3); English literature (1); essays (1); *optional*, seven hours, of which at least four must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*) or *zoology*.

Third Term.—Acoustics and optics (3); descriptive geometry (4); English literature (1); essays (1); *optional*, seven hours, of which at least four must be given to one of the following sciences: *botany*, *chemistry*, *geology* or *zoology*.

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); *optional*, eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany*, *chemistry*, *geology*, *mathematics*, *physics* or *zoology*.

Second Term.—American history (2); political economy (2); *optional*, eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

Third Term.—Constitution of the United States, twelve lectures. *Optional*, eleven hours, subject to the same conditions as in the first term of this year.

The optional hours not required for science in the junior and senior years may be given to either scientific, literary, historical or philosophical subjects. In electing their particular lines of study in the sciences of the junior or senior year, students will be required to take at least the minimum amount of each science elected that is given throughout the year.

Students intending to take the physics of the senior year must take the calculus of the sophomore year; those intending to take geology of the senior year must take blow-pipe determination of minerals previous to that year.

2. The Course in Mathematics.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Algebra (2); spherical trigonometry (3); French and German (8); rhetoric and composition (2); linear draughting (2).

Third Term.—Harmonoid geometry (3); French and German (8); botany (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); experimental mechanics (3); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Second Term.—Analytic geometry of three dimensions (2); modern methods in analytic geometry (3); calculus (3); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Third Term.—Calculus continued (5); descriptive geometry (4); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); descriptive geometry continued (4); heat (2); physiology (3): essays (1).

Second Term.—Differential equations (3); quaternions (2); acoustics and optics (3); chemistry (3); zoology (3); essays (1).

Third Term.—Differential equations continued and theory of functions (5); acoustics and optics (3); chemistry (3); logic (3); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Analytic and celestial mechanics (3); mathematical essays (1); astronomy (3); shades, shadows and perspective (3); modern history (3); geology (3); English literature (1).

Second Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); philosophy of history (3); English literature (1); *optional* (5).

Third Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); twelve lectures on the Constitution of the United States; English literature (1); *optional* (6.)

For most of those studies in this course which are not closely connected with mathematics, substitutes will be allowed.

3. THE COURSE IN NATURAL HISTORY.

FIRST OR FRESHMAN YEAR.

First Term.—French and German (8); rhetoric (2); free-hand drawing (5); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

Third Term.—Modern languages (8); rhetoric (2); chemical lectures (3); chemical laboratory work (3).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); rhetoric (1); lectures on human physiology (3); lectures and laboratory work in anatomy (3); experimental mechanics (3); organic chemistry (2).

Second Term.—French *or* German (3); rhetoric (1); lectures on zoology (3); lecture and laboratory work in physiological anatomy and histology (6); electricity and magnetism (2).

Third Term.—French *or* German (3); rhetoric (1); general lectures on botany (3); field work in botany (2); lectures on the comparative anatomy of the brain (2); laboratory work in zoology (3); electricity and magnetism (2).

THIRD OR JUNIOR YEAR.

First Term.—Lectures and laboratory work on vascular cryptogams (3); laboratory and field work on compositæ or special groups (2); lectures on geology (3); blow-pipe determination of minerals (3); heat (2); essays (1); English literature (1).

Second Term.—Lectures on vegetable physiology (3); vegetable histology (2); lectures on advanced and economic geology (3); laboratory work in geognosy (3); acoustics and optics (3); essays (1); English literature (1).

Third Term.—Lectures and laboratory work on algæ and musci (2); entomology (2); lectures on palæontology (3); laboratory work in palæontology (3); laboratory and field work in entomology (3); acoustics and optics (3).

FOURTH OR SENIOR YEAR.

First Term.—Lectures and laboratory work on fungi (3); lectures on principles of horticulture (2); lectures on anatomy and physiology of domestic animals (5); laboratory and field work in geology (5); history of philosophy (2).

Second Term.—Lectures on systematic and applied botany (3); laboratory work on graminæ or special groups (2); (the course in botany for this term alternates with that of the winter term of the

junior year); laboratory work in geology or palæontology (3); advanced work in either botany, geology or zoology (8).

Third Term.—Advanced work in botany, geology or zoology or veterinary medicine and surgery (13).

Students intending to enter medical schools will be allowed to devote to human anatomy and physiology some of the time otherwise given to general zoology.

III. TECHNICAL COURSES.

1. THE COURSE IN ACRICULTURE.

Leading to the Degree of Bachelor of Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); drawing, free-hand (3); German (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Chemistry, general (3); geometry (5); German (5); rhetoric and composition (2).

Third Term.—Chemistry, general (3); German (5); rhetoric and composition (2); trigonometry and mensuration (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); German (3); experimental mechanics (3).

Second Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (4); drawing, free-hand (3); German (3); electricity and magnetism (2).

Third Term.—Botany lectures (3), field work (2); entomology (5); German (3); land surveying (3).

THIRD OR JUNIOR YEAR.

First Term.—Botany (vascular cryptogams) (3), compositæ and field work *or* practical horticulture (2); geology (3); heat (2); veterinary anatomy and physiology (5).

Second Term.—Acoustics and optics (3); botany (vegetable physiology), lectures (3); vegetable histology and laboratory work *or* practical horticulture (2); chemical practice, quantitative analysis (4); veterinary medicine and surgery (5).

Third Term.—Acoustics and optics (3); botany, special field or laboratory work *or* practical floriculture (3); chemical practice, quantitative analysis (5); veterinary medicine and surgery (5).

FOURTH OR SENIOR YEAR.

First Term.—Agriculture, lectures (5); practice (3) (Tuesday and Thursday afternoons); botany (fungi) (3), principles of horticulture (2); geology, practice (3).

Second Term.—Agriculture, lectures (5); practice (2) (Tuesday and Thursday afternoons); botany (systematic and applied, lectures) (3), laboratory work on gramineæ or special groups (2); horticulture (2).

Third Term.—Agriculture, lectures (4); practice (3) (Tuesday and Thursday afternoons); building materials and construction (2); constitutional law (1).

2. THE COURSE IN ARCHITECTURE.

Leading to the Degree of Bachelor of Architecture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric (2); free-hand drawing (3); linear drawing; six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Algebra (2); trigonometry (3); French *or* German (5); rhetoric (2); free-hand drawing (3); projection and tinting.

Third Term.—Descriptive geometry (4); draughting (2); French *or* German (5); rhetoric (2); shading.

SECOND OR SOPHOMORE YEAR.

First Term.—Descriptive geometry and draughting (6); French *or* German (3); experimental mechanics (3); free-hand drawing (3).

Second Term.—Analytical geometry (5); French *or* German (3); chemistry (3); electricity and magnetism (2); draughting (2).

Third Term.—Building materials and construction (3); French *or* German (3); calculus (5); botany (3); electricity and magnetism (2); architectural draughting (2).

THIRD OR JUNIOR YEAR.

First Term.—Shades, shadows, and perspective (3); mechanics (3); heat (2); lectures on Egyptian, Greek, and Roman architecture (3); designing (4).

Second Term.—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (5); optics and acoustics (3); mechanics (2); designing (4).

Third Term.—Optics and acoustics (3); lectures on Gothic architecture (5); free-hand-drawing (3); designing (5).

FOURTH OR SENIOR YEAR.

First Term.—Lectures on renaissance architecture (3); lectures on composition and the art of designing (2); geology (3); designing (7).

Second Term.—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (3); designing (4).

Third Term.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., (3); designing (9); preparation of thesis.

3. THE COURSE IN CHEMISTRY AND PHYSICS.

Leading to the Degree of Bachelor of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Solid geometry (5); French and German (8); rhetoric and composition (2).

Third Term.—Trigonometry (5); French and German (8); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); French *or* German (3); experimental mechanics (3); physiology (3); chemical practice (2).

Second Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); zoology (3); chemical practice (6).

Third Term.—Chemistry (3); electricity and magnetism (2); French *or* German (3); botany (3); chemical practice (4).

THIRD OR JUNIOR YEAR.

First Term.—Chemical philosophy (3); heat (2); geology (3); chemical practice (7).

Second Term.—Chemical philosophy (3); mineralogy *or* metallurgy (2); organic chemistry (1); acoustics and optics (3); geology (3); chemical practice (5).

Third Term.—Chemical philosophy (3); chemical technology (2); acoustics and optics (3); chemical practice (7).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (2); physical practice (4); chemical practice (10); organic chemistry (1),

Second Term.—Metallurgy *or* mineralogy (2); organic chemistry (2); chemical practice (8); physical practice (4).

Third Term.—Chemical technology (2); chemical processes (2); chemical practice (8); organic chemistry (1); thesis.

4. COURSES IN CIVIL ENGINEERING.

A Four Years Course, Leading to the Degree of Bachelor of Civil Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); rhetoric and composition (2); free-hand drawing (3); six lectures on hygiene, commencing on the first Monday in the term.

Second Term.—Algebra (2); spherical trigonometry (3); French *or* German (5); rhetoric and composition (2); right line drawing (2); free-hand drawing (3).

Third Term.—Descriptive geometry (3); draughting (2); French *or* German (5); rhetoric and composition (2); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); descriptive geometry (4); French *or* German (3); experimental mechanics (3); draughting of original problems (2).

Second Term.—Analytic geometry of three dimensions (2); calculus (3); French *or* German (3); electricity and magnetism (2); chemistry (3); pen topography (2); tinting and shading (2).

Third Term.—Calculus (5); land surveying (4); electricity and magnetism (2); chemistry (3); lettering and sketching (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); geology (3); shades, shadows and perspective (3); heat (2); topographical mapping and sketching (2).

Second Term.—Advanced geology (3); analytic mechanics (5); mineralogy (2); acoustics and optics (3); graining and draughting details of structures (2).

Third Term.—Analytic mechanics (5); railroad surveying (5); acoustics and optics (3); colored topography (3).

FOURTH OR SENIOR YEAR.

First Term.—Spherical astronomy (5); analytic mechanics (5); architecture (3); stereotomy (3); draughting of original problems; technical essay.

Second Term.—Analytic mechanics (5); geodesy (5); stone cutting, original problems and draughting (5); metallurgy (2).

Third Term.—Civil engineering (3); engineering economy (2); bridge construction (5); water wheels (2); hydrographic surveying, chart making and geodetic practice (3); preparation of thesis.

Students in this course will be required to present, at the beginning of the first term of their second, third and fourth years, a memoir upon subjects selected by them before the close of the spring term. The memoirs of the first two years will refer to descriptions and drawings of some important engineering work, manufacturing process or other suitable subject; but during the remainder of the course the students are required to embody in their memoirs or reports original investigations.

A Five Years Course, Leading to the Degree of Civil Engineer.

The first and second years the same as in the preceding course. The studies in *italics* are introduced chiefly from the Course in Science and Letters, those in SMALL CAPITALS are new and of a technical character.

THIRD YEAR.

First Term.—Calculus (5); ***Roman history*** (5), ***or physiology*** (3), ***and modern languages*** (2); heat (2); topographical mapping (2); ***essays and English literature*** (2).

Second Term.—***Philosophy of history*** (3); ***history of the Roman empire*** (5); ***or, zoology*** (3); ***modern languages*** (2); ***or, instead of languages, essays*** (1); ***and English literature*** (1); mechanics (5); acoustics and optics (3); structural details (2).

Third Term.—Mechanics (5); railroad surveying (5); acoustics and optics (3); ***mediæval history*** (5); ***or, laboratory work*** (3); ***and modern languages*** (2); ***or, instead of languages, essays*** (1); ***and English literature*** (1).

FOURTH YEAR.

First Term.—Geology (3); mechanics (5); Egyptian, Greek, and Roman architecture (3); shades, shadows and perspective (3); civil engineering (2); ***American history*** (2); ***or, general literature and oratory*** (3).

Second Term.—Geology (3); mechanics (5); ***American history*** (2); ***or, Romanesque architecture*** (3); ***or, modern languages*** (2); ***political economy*** (2); ***general literature and oratory*** (3).

Third Term.—Civil engineering (3); ***logic*** (3); ***or, modern languages*** (3); ***or, general literature and oratory*** (3); ***or, Gothic architecture*** (3); engineering economy (2); bridge construction (5); colored topography (3); two weeks hydrographic practice (3).

FIFTH YEAR.

First Term.—Spherical and practical astronomy (5); ***modern history*** (3); stereotomy and draughting (5); SPECIAL WORK IN

PROJECTS, DESIGNS AND ESTIMATES (3); or, RENAISSANCE ARCHITECTURE (3).

Second Term.—Geodesy (5); stone cutting (5); metallurgy (2); TECHNICAL READING IN FOREIGN LANGUAGES (2); SPECIAL WORK IN ASTRONOMY AND GEODESY (3).

Third Term.—*American law and polity* (5); *or, quarternions and philosophy of mathematics* (5); hydraulic motors (3): *historical reading* (2); hydrography (3); THE STEAM-ENGINE (2); original thesis.

On the satisfactory completion of the first four years of this course, students may take the degree of B. S., and become entitled to all the privileges of resident graduates.

5. THE COURSE IN MECHANIC ARTS.

Leading to the Degree of Bachelor of Mechanical Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); French *or* German (5); freehand drawing and shop practice (5).

Second Term.—Solid geometry (5); French *or* German (5); freehand drawing and shop practice (7).

Third Term.—Trigonometry (5); French *or* German (5); descriptive geometry (3); shop practice (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); German *or* French (3); machine construction (3); descriptive geometry (4); shop practice (2).

Second Term.—Analytical geometry of three dimensions (2); calculus (3); German *or* French (3); chemistry (3); electricity and magnetism (2); shop practice (3).

Third Term.—Calculus (5); German *or* French (3); electricity and magnetism (2); chemistry (3); shop practice (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); shades, shadows and perspective (3); heat (2); chemistry (2); rhetoric and composition (2); shop practice (3).

Second Term.—Acoustics and optics (3); machine construction and drawing (4); mechanics (5); rhetoric and composition (2); shop practice (3).

Third Term.—Machine construction and drawing (4); mechanics (5); mill work (4); shop practice (2).

FOURTH OR SENIOR YEAR.

First Term.—Mechanism (5); machine drawing (4); mechanics (5); shop practice (3).

Second Term.—Designing machinery (4); physical laboratory practice (4); steam-engine (5); shop practice (3).

Third Term.—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (5).

IV. SHORTER COURSES.—Leading to no Degree.

1. A Three Years Course in Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Algebra (5); chemistry, agricultural (5); chemical practice (3); drawing, freehand (3).

Second Term.—Chemistry, agricultural (5); chemical practice (5); geometry (5.

Third Term.—Botany (5); entomology (5); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany (5); geology (3); mechanics (3); veterinary anatomy and physiology (5).

Second Term.—Botany (5); chemical practice (5); veterinary medicine and surgery (5).

Third Term.—Botany (3); chemical practice (4); land surveying (3); veterinary medicine and surgery (5).

Third or Junior year same as the fourth year of the four years course.

2. A Two Years Course in Chemistry and Physiology.

Requirements for admission the same as in the Natural History Course, except the year of French or German.

FIRST YEAR.

First Term.—French (5); physiology (3); psychology (2); chemical laboratory practice (3); free-hand drawing (3); rhetoric and composition (2); six lectures on hygiene.

Second Term.—French (5); zoology (3); chemistry, lectures (3); chemical laboratory practice (3); free-hand drawing (3); rhetoric and composition (2).

Third Term.—French (5); general botany, lectures (3); botanical laboratory practice (2); lectures on chemistry (3); medical chemistry, laboratory practice (4); rhetoric and composition (2).

SECOND YEAR.

First Term.—German (5); organic chemistry (2); heat (2);

anatomy and physiology of domesticated animals (5); laboratory practice in anatomy (3); five lectures on medical entomology.

Second Term.—German (5); vegetable physiology, or systematic and applied botany (3); electricity and magnetism (2); veterinary medicine (5); laboratory practice in physiological anatomy and histology (3); laboratory practice in vegetable physiology (2).

Third Term.—Scientific German (3); comparative anatomy of the brain (2); electricity and magnetism (2); veterinary medicine and surgery (5); laboratory practice in physiological anatomy (5).

As the lectures on heat, and those on electricity and magnetism are given only once in two years, the students will take the exercises in rhetoric and composition in year when the lectures on heat and electricity are not given.

On the completion of the course a certificate to that effect will be given the student, signed by the President and the Professor in charge of the Department of Physiology.

3. A TWO YEARS COURSE IN HISTORY AND POLITICAL SCIENCE.

Requirements for admission the same as for Optional Students, with the addition of Latin Grammar and four Books of Cæsar.

FIRST YEAR.

First Term.—Roman history (5); psychology (2); rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5); six lectures on hygiene beginning the first Monday in the term.

Second Term.—History of the Roman Empire (5); moral philosophy (2) rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5).

Third Term.—Mediæval history (5); logic (3); rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5).

SECOND YEAR.

First Term.—Modern history (3); American history (2); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

Third Term.—American law (5); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

On the completion of the course the student will have a certificate to that effect, signed by the President and the Dean of the Faculty of History and Political Science.

EXAMINATION PAPERS.

ENTRANCE EXAMINATIONS.

[*The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek and in Latin, an oral examination was added to the written one.*]

ARITHMETIC.

1. Write the Metric table of Long Measure. What is meant by each of the prefixes, from *milli*—to *myria*—inclusive? How many cubic centimeters in a liter? In a gramme of distilled water? In a kilogramme of water? A cubical block whose edge is 250 millimeters is made of wood $\frac{4}{5}$ as heavy as distilled water. Find its weight in kilogrammes; also in pounds and ounces Avoirdupois, the kilogramme being about $2\frac{1}{5}$ lbs.

2. Define a Prime Number; Numbers prime to each other; the Least Common Multiple of two or more numbers. Find the greatest common divisor and the least common multiple of 437, 551, and 703.

3. Define an Integer; a Complex Fraction; a Compound Fraction. What is the reciprocal of $\frac{1}{3}$? Of $\frac{2}{3}$? Of 5? What does the denominator of a fraction represent? The numerator? Why is the value of the fraction unchanged when both terms are multiplied by the same number? Arrange in the ascending order of magnitude the fractions $\frac{11}{30}$, $\frac{10}{31}$, and $\frac{1}{3}$.

Simplify $\dfrac{1}{1+\dfrac{2}{3\frac{1}{3}}}$.

4. Divide 2.56 by .0032. By 3.2. By 320. State and demonstrate the rule for pointing off in multiplication of decimals. Make the following circulating decimals similar and conterminous; and add them: $.\dot{2}$, $.\dot{1}\dot{8}$, $.\dot{2}5\dot{6}$.

5. On a note for $1500, dated Jan. 1, 1876, and bearing interest at 7 per cent., were the following indorsements: April 1, 1876, $250; Dec. 5, 1876, $400. What was due Jan. 1, 1877?

GEOGRAPHY.

1. Describe the systems of mountain chains by which the surface of the earth is traversed.
2. Describe the table-lands of Asia.
3. Describe the Great Northern Plain of Europe.
4. What is the average depth of oceans?
5. Name the principal ocean currents.
6. Bound Holland; Turkey in Europe; Switzerland.
7. Bound Beloochistan; China Proper; Arabia.
8. Bound Idaho; Missouri; Maryland.
9. Bound Bolivia; Uraguay; The Argéntine Republic.
10. Over what waters would one sail from Philadelphia to the Crimea.
11. Over what waters would one sail from Bombay to Lyons?
12. Over what waters would one sail from Yokohama to Paris?
13. What countries would one pass on the right in coasting from Honduras to Alaska?
14. What countries would one pass on the left in coasting from Calcutta to Behring's Straits?
15. Name the countries of Africa.
16. Name the rivers of Spain, of France, of Germany, of Italy.
17. Over what countries would a straight line from Pekin to Madrid pass?
18. What productions of Africa form articles of commerce with the United States?
19. How could one go by water from Montevideo to Pittsburgh?

ENGLISH GRAMMAR.

1. Explain the use of *either* and *or*, *neither* and *nor*, *each*, *both*, *whither* and *whether*, *whence* and *thence*.
2. Mention the gutturals, dentals, and labials of the English alphabet.
3. What is meant by "parts of speech"?
4. State the use or function of each of the parts of speech.
5. When is a noun said to be in the objective case?
6. Give four examples of irregular comparison in adjectives.
7. How are reflexive pronouns formed?
8. Why are some pronouns called relative?
9. Is an objective case ever used after intransitive verbs?
10. Define *inflection*, *intransitive*, *finite*, *mood*, *participle*, *orthography*, *diminutive*, *orthoëpy*, *exception*.
11. Name some adverbs of negation; of cause and effect.
12. In what ways may the grammatical subject be enlarged?
13. When is a noun or an adjective used predicatively?
14. Give a definition of the two "parts of speech" required to form a sentence.

15. Change into the singular number the entire subject and the verb in the sentence: Those men are building houses.
16. When is *e* mute omitted at the end of a word, and when is it retained, a syllable being added?
17. State some of the uses of *it*.
18. State the grammatical relation and etymology of each word in the following sentence: Short his career, but ably run.
19. What is the objective or factitive predicate?
20. Write out correctly the following sentences:
(*a*) One fine afternoon everybody was on deck amusing themselves as they can.
(*b*) Whom but he was true to me.
(*c*) Lord Macaulay has been bolder than his predecessors; he has shrank from no conclusion.
(*d*) Which rule, if it had been observed, a neighboring prince would have wanted a great deal of that incense which has been offered up to him.
(*e*) Their chairs did not touch; they were placed one on either of the four sides of the table, leaving the fourth vacant.
(*f*) Man could now travel further in an hour than he had previously in a day.
(*g*) Six month's interest are due.
(*h*) He is a worthy representative of the great principles on whom Republicanism has always and must stand.
(*i*) Nothing need to be said so firmly and nothing oftener than this.
(*k*) How will we know which is the greatest of the two?
21. Give an example of the formation of the past tense from the present, by a change (*a*) of vowel; (*b*) of termination; (*c*) by no change.
22. Write a sentence containing an adjective clause, drawing a line under the clause.
23. Write an interrogative sentence, and parse it.
24. Write a sentence in which the verb has a direct and an indirect object, stating which is the direct and which the indirect.

PLANE GEOMETRY.

1. If the opposite sides of a quadrilateral be equal each to each, the equal sides are parallel, and the figure is a parallelogram.
2. To draw a common tangent to two given circles; and demonstrate.
3. Two triangles are similar, if their homologous sides be proportional.
4. The 4 bisectors of the angles of any quadrilateral form in general a second quadrilateral whose opposite angles are supplementary.
5. The surface [or the perimeter] of a regular inscribed polygon

and that of a similar circumscribed polygon being given, to find the surfaces [or the perimeters] of the regular inscribed and circumscribed polygons having double the number of sides.

ELEMENTARY PHYSIOLOGY.

[*At least five of the following questions will be asked.*]

1. Make an outline diagram of the body, excluding head and limbs, and locate within it the following organs: Stomach, heart, liver, lungs, spleen, kidneys, intestine, diaphragm.
2. Name the chemical elements of the body, stating which are gases.
3. What first happens to milk in the stomach?
4. Enumerate the digestive fluids, stating which is acid.
5. State all the uses of the stomach.
6. What is the object of digestion?
7. Give a diagram of the right side of the heart.
8. Of the left side.
9. What is the heart composed of?
10. What are the differences between the air inspired, and the air expired.
11. Give some familiar examples of acids.
12. Give some familiar examples of alkalies.
13. Describe the movements of a frog's heart while beating. (The frog is supposed to have been etherized, or killed by cutting the spinal cord just behind the head.)
14. Which way does blood flow in the arteries of the arm? Which way in the veins of the arm? How do you know?
15. Explain the pulse.
16. What changes in the form of the body occur during inspiration? What during expiration?
17. State the average number of your respirations per minute when sitting still; while standing; while lying down. State the same for the pulse.
18. What is the pupil of the eye?
19. What change of the pupil occurs when one comes from a dark into a lighter room?
20. Do the ribs usually move in respiration while lying down?
21. How many teeth has a child four or five years old, and what are they called?
22. How many teeth has a youth of fifteen?
23. How many has a grown person? Name the different kinds of teeth.
24. Name the uses of the tongue.
25. Name the uses of the lips and cheeks.
26. What happens in the throat when you swallow?
27. What is the difference between walking and running?

28. What is the peculiar property of the muscular tissue (the red flesh or lean meat)?

29. Make an outline diagram of a frog's brain. (Kill the frog, or toad, with chloroform, and remove the top of the head between the eyes with a penknife.

30. Enumerate the principal parts of the central nervous system. (They are the spinal cord, medulla oblongata, cerebellum, optic lobes, thalami, hemispheres, and olfactory lobes.)

ALGEBRA THROUGH QUADRATICS.

1 (*a*). Remove the parentheses from

$$3a^2-2b\left\{a+\frac{a}{b}[a-\tfrac{1}{2}(b+c)]\right\},$$

simplify the result, and find its value when $a=-2$, $b=3$, $c=0$.

(*b*). Divide $6x+4x^4+1+3x^2$ by $-2x+3+2x^2$, finding the quotient to 3 terms, the remainder, and the "complete quotient."

2 (*a*). What is meant by "a negative quantity"? Is $(-m)$ a positive or a negative quantity, if $m=-3$?

(*b*). What is the value of 0×0? Of 0×3? Of $\frac{3}{0}$? Of $\frac{0}{3}$, and why? Of $\frac{0}{0}$, and why?

(*c*). Into a cistern whose capacity is 1000 gallons and which is now half full, n gallons of water flow per minute, and 10 gallons flow out. How soon will the cistern be empty? Interpret your result when $n=10$; also when $n=15$.

3 (*a*). Factor completely $2ax^4-2ay^4$; also, $1+8a^3b^3$.

(*b*). Prove that when m is a whole number, a^m-b^m is always divisible by $a-b$.

4. Simplify $\left(\frac{x^2-y^2}{x^2+y^2}-\frac{x^2+y^2}{x^2-y^2}\right)\div\left(\frac{x-y}{x+y}-\frac{x+y}{x-y}\right)$.

5 (*a*). Find x, y and z from the equations $3x+2y+z=0$, $5x+3y+z=-1$, $2x-y+z=0$.

(*b*). Solve the equation $\sqrt{(x+11)}-\sqrt{x}=1$, and verify your result.

(*c*). Find how far you must ride at the rate of a miles an hour, and walk back at the rate of b miles an hour, to be gone c hours.

6 (*a*). Reduce the following radicals to their simplest form, and add them: $\frac{3}{4}(\sqrt[3]{96})$, $\sqrt[3]{\frac{3}{2}}$, $144^{\frac{1}{6}}$.

(*b*). Simplify $\dfrac{3^{-\frac{1}{3}}\,a^{\frac{4}{3}}}{3^{\frac{2}{3}}\,a^{-\frac{5}{3}}}(2b)^0$; also, $(5^{\frac{2}{3}})^{\frac{3}{4}}$.

(*c*). Multiply $\left(a^{\frac{n}{2}}+a^{-\frac{n}{2}}\right)$ by $\left(a^{\frac{n}{2}}-a^{-\frac{n}{2}}\right)$.

7 (*a*). What is the value of $\sqrt{-5}\times\sqrt{-5}$, and why?

(*b*). Multiply $3+\sqrt{-2}$ by $\sqrt{2}-2\sqrt{-1}$.

8 (*a*). Solve the quadratic equation $x^2-5x+2=0$.

(*b*). Solve the equation $2x^2+8px=q$. What is meant by "a

root of an equation"? What conditions must p and q satisfy in order that the two roots of the above equation may both be real and positive? Both imaginary? Equal to each other?

(c). Form the quadratic whose roots are $2+\sqrt{3}$ and $2-\sqrt{3}$.

9. Extract the square root of $$x^4-x^3+\frac{x^2}{4}+4x-2+\frac{4}{x^2}.$$

FRENCH.

1. The house which you bought this week is that which was built a year ago. Is it not?

2. You must go and see it, but I do not believe that you can tell me if it is the same house.

3. Are you not afraid that the soldier will hurt the child? He has the French knives which he stole this morning from your father.

4. My sister was afraid that he was not coming, and I do not believe that she is wrong.

5. He wanted you to set out from Paris, but I do not think that you have money enough.

6. Are you my father's scholar of whom I have heard him speak? I am.

7. It is not I to whom you wrote, it is one of my younger brothers. I have just sent for him.

8. Whose silk is that which I saw in the store of the old English merchant? I would like to buy some. Who will sell me some?

9. My father is the best friend I have and I will give him the only horse I have.

10. It was in vain for her mother to reproach her, she said yesterday she was going to marry the French cook.

11. Do you know those ladies with whom we were speaking French when we were riding on horseback?

12. Where are the goods which you have just sold and which you wished my servant to carry to my house?

13. The birds you saw killed this morning are partridges, and I have bought some and will have them roasted to-morrow.

14. Do you remember the songs we heard him sing this summer, at your uncle's house? Would you not wish him to come and see us?

15. Would you wish her every day to sing French songs, read French books, write French exercises, and talk with certain good people?

GERMAN.

I.

1. Translate:

Aus "Undine."

Von dem, was dem Ritter im Walde begegnet war.

"Es mögen nun etwa acht Tage her sein, da ritt ich in die freie Reichsstadt ein, welche dort jenseit des Forstes gelegen ist. Bald darauf gab es darin ein schönes Turnieren und Ringelrennen, und ich schonte meinen Gaul und meine Lanze nicht. Als ich nun einmal an den Schranken still halte, um von der lustigen Arbeit zu rasten, und den Helm an einen meiner Knappen zurück reiche, fällt mir ein wunderschönes Frauenbild in die Augen, das im allerherrlichsten Schmuck auf einem der Altane stand und zusah. Ich fragte meinen Nachbar, und erfuhr, die reizende Jungfrau heisse Bertalda, und sei die Pflegetochter eines der mächtigen Herzoge, die in dieser Gegend wohnen. Ich merkte dass sie auch mich ansah, und—wie es nun bei uns jungen Rittern zu kommen pflegt—hatte ich erst brav geritten, so ging es nun noch ganz anders los. Den Abend beim Tanze war ich Bertalda's Gefährte, und das blieb so alle die Tage des Festes hindurch."

2. Parse the following nouns, writing the genitive singular and nominative plural of each: *Tage* (1), *Forstes* (2), *Ringelrennen* (3), *Arbeit* (5), *Knappen* (6,) *Pflegetochter* (10).

3. Parse fully the following verbs, giving the principal parts, rule for the mood, tense, and position of each: *mögen* (1), *ritt* (1), *gelegen ist* (2), *gab* (3), *halte* (5), *fällt* (7), *zusah* (8), *heisze* (10).

II.

1. Translate:

Man höret oft im fernen Wald
Von obenher ein dumpfes Läuten,
Doch Niemand weiss von wann es hallt,
Und kaum die Sage kann es deuten.
Von der verlor'nen Kirche soll
Der Klang ertönen mit den Winden;
Einst war der Pfad von Wallern voll,
Nun weiss ihn keiner mehr zu finden.

Jüngst ging ich in dem Walde weit,
Wo kein betret'ner Steig sich dehnet,
Aus der Verderbniss dieser Zeit
Hatt' ich zu Gott mich hingesehnet.
Wo in der Wildniss Alles schwieg,
Vernahm ich das Geläute wieder;
Je höher mein Sehnsucht stieg,
Je näher, voller klang es nieder.

Mein Geist war so in sich gekehrt,
Mein Sinn vom Klange hingenommen,
Dasz mir es immer unerklärt,
Wie ich so hoch hinauf gekommen.
Mir schien es mehr denn hundert Jahr',
Dasz ich so hingeträumet hätte:
Als über Nebelen, sonnenklar,
Sich öffnet eine freie Stätte.

2. Comment upon the following words, explaining any peculiarity in form, use, or meaning; point out derivative words and explain their origin: *obenher* (2), *Niemand* (3), *soll* (5), *Wallern* (7), *keiner* (8), *finden* (8), *jüngst* (9), *Steig* (10), *Verderbniss* (11), *gekommen* (20), *hingeträumet hätte* (22).

3. Define the clauses and their use introduced by *Wo* (10), *Dasz* (19), *Wie* (20), *Dasz* (22).

III.

Translate into German:

1. The prudent (*klug*) lady would have given advice to the old teacher, if he had allowed himself to be advised (*sich Rathe geben lassen*).

2. The young lady caused (*lassen*) the old serving-woman to be sent for (*holen*), who had fetched the letter.

3. Since (*da*) you have not sent us the letter, you will be obliged to cause the servant to fetch it.

4. If the traveler arrives (*ankommen*) to-day, then call me immediately.

5. Your friend understands the German language very well, but he speaks only a very little as yet, and he still takes lessons (*Unterricht*).

LATIN.

I.

1. Translate (Cic. in Cat., IV, 8):

Servus est nemo, qui modo tolerabili condicione sit servitutis, qui non audaciam civium perhorrescat, qui non haec stare cupiat, qui non quantum audet et quantum potest conferat ad communem salutem voluntatis. Quare si quem vestrum forte commovet hoc, quod auditum est, lenonem quendam Lentuli concursare circum tabernas, pretio sperare posse sollicitari animos egentium atque imperitorum, est id quidem coeptum atque temptatum, sed nulli sunt inventi tam aut fortuna miseri aut voluntate perditi, qui non illum ipsum sellae atque operis et quaestus cotidiani locum, qui non cubile atque lectulum suum, qui denique non cursum hunc otiosum vitae suae salvum esse velint.

2. Give the syntax of *condicione, voluntatis, concursare, for-*

tuna. Explain the subjunctives *sit*, *cupiat*, *velint*. Decline *nemo*, *vestrum*, *operis*, *quaestus*. To what classes of verbs do *perhorrescat*, *audet*, and *concursare* belong? Give the principal parts of *cupiat*, *audet*, *coeptum est*. Give the synopsis of *velint* in the second person singular. Give all the participles, infinitives, and imperative forms of *conferat*. Compare *bene*, *felix*, *facilis*, *primus*, *vetus*. State the time, place, and manner of Cicero's death.

II.

1. Translate (Virg. A. IV, 238–241):

Dixerat. Ille patris magni parere parabat
Imperio; et primum pedibus talaria nectit
Aurea, quae sublimem alis sive aequora supra
Seu terram rapido pariter cum flamine portant.

2. Who are meant by *Ille* and *patris?* Divide the passage into feet, and give rules for the quantities of vowels in the first line.

III.

Translate into Latin:

(1) He says that he has not many books. (2) Do you know how high this tree is? (3) I hope that our friend, after seeing the king, will come to Rome. (4) He fears that he cannot go to-day. (5) Tell me whether you are to come alone, or with your daughters.

GREEK.

[*N.B.*—Write the Greek words *with their accents.*]

I.

Translate any *three* of the following five passages, and answer the questions under *all* of them.

1. *Ξενοφῶν δὲ, παρελαύνων ἐπὶ τοῦ ἵππου, παρεκελεύετο· Ἄνδρες, νῦν ἐπὶ τὴν Ἑλλάδα νομίζετε ἁμιλλᾶσθαι, νῦν πρὸς τοὺς παῖδας καὶ τὰς γυναῖκας, νῦν ὀλίγον πονήσαντες ἀμαχεὶ τὴν λοιπὴν πορευσόμεθα.*

Give the gen. and dat. in all numbers of *Ἄνδρες*: the voc. sing. and the gen. plur. of *παῖδας*.

2. *Ταύτην μὲν οὖν τὴν νύκτα ἔμειναν ἐν πολλῇ ἀπορίᾳ ὄντες. Ξενοφῶν δὲ ὄναρ εἶδεν· ἔδοξεν ἐν πέδαις δεδέσθαι, αὗται δὲ αὐτῷ αὐτόμαται περιρρυῆναι, ὥστε λυθῆναι καὶ διαβαίνειν ὁπόσον ἐβούλετο.*

Give the nom. sing. and plur. in all genders of *ταύτην*: dat. plur. in all genders of *ὄντες*: synopsis of the tense and voice to which *ἔμειναν* belongs. In what tense, mood, voice, and from what verbs are *εἶδεν, δεδέσθαι, περιρρυῆναι?*

3. *Ταῦτα ἐννοούμενοι καὶ ἀθύμως ἔχοντες, ὀλίγοι μὲν*

αὐτῶν εἰς τὴν ἑσπέραν σίτου ἐγεύσαντο, ὀλίγοι δὲ πῦρ ἀνέκαυσαν, ἐπὶ δὲ τὰ ὅπλα πολλοὶ οὐκ ἦλθον ταύτην τὴν νύκτα.

Give the principal parts of *ἔχοντες, ἀνέκαυσαν, ἦλθον*. Explain the phrase *ἀθύμως ἔχοντες*: the *case* of *σίτου*.

4. *Παύσασθε ἁμάρτοντες ἐς τὴν πατρίδα, καὶ μὴ πείθεσθε τοῖς ἀνοσιωτάτοις τριάκοντα, οἳ ἰδίων κερδέων ἕνεκα ὀλίγου δεῖν πλείους ἀπεκτόνασιν Ἀθηναίων ἐν ὀκτὼ μησὶν ἢ πάντες Πελοποννήσιοι δέκα ἔτη πολεμοῦντες.*

Give the acc. sing. in all genders of *πλείους*: the first seven cardinal numerals in Greek. Who were *the Thirty*, and how did they come into power?

5. *Καὶ γὰρ ἐν ταῖς μάχαις πολλάκις δῆλον γίγνεται ὅτι τό γε ἀποθανεῖν ἄν τις ἐκφύγοι καὶ ὅπλα ἀφεὶς καὶ ἐφ' ἱκετείαν τραπόμενος τῶν διωκόντων· καὶ ἄλλαι μηχαναὶ πολλαί εἰσιν ἐν ἑκάστοις τοῖς κινδύνοις ὥστε διαφεύγειν θάνατον, ἐάν τις τολμᾷ πᾶν ποιεῖν καὶ λέγειν.*

Give synopsis of the tense and voice to which *ἀφείς* belongs. Point out the enclitics in this passage. Explain the mood of *τολμᾷ*.

II.

Translate into Attic Greek: The men came to him, saying that they did not wish to march that night. Accordingly he remained, that they might not be despondent.

III.

Translate:

Ἔγρετο δ' ἐξ ὕπνου· θείη δέ μιν ἀμφέχυτ' ὀμφή·
Ἕζετο δ' ὀρθωθείς· μαλακὸν δ' ἔνδυνε χιτῶνα,
Καλὸν, νηγάτεον· περὶ δὲ μέγα βάλλετο φᾶρος·
Ποσσὶ δ' ὑπὸ λιπαροῖσιν ἐδήσατο καλὰ πέδιλα·
Ἀμφὶ δ' ἄρ' ὤμοισιν βάλετο ξίφος ἀργυρόηλον.

Give the Attic form of *θείη* and *ποσσί*. In what tense, mood, voice, and from what verbs, are *ἔγρετο* and *ἀμφέχυτο*? Scan the last line.

Τὴν δὲ χολωσαμένη προσεφώνεε δῖ' Ἀφροδίτη·
Μή μ' ἔρεθε, σχετλίη, μὴ χωσαμένη σε μεθείω,
Τὼς δέ σ' ἀπεχθήρω, ὡς νῦν ἔκπαγλ' ἐφίλησα,
Μέσσῳ δ' ἀμφοτέρων μητίσομαι ἔχθεα λυγρά,
Τρώων καὶ Δαναῶν, σὺ δέ κεν κακὸν οἶτον ὄληαι.

Give the Attic form of *προσεφώνεε, μέσσῳ, ὄληαι*. In what tense, mood, voice, and from what verbs, are *ἀπεχθήρω* and *ὄληαι*?

SOLID GEOMETRY.

1. The sum of any two face-angles of a triedral angle is greater than the third.

2. Two prisms are equal, if three faces including a triedral angle of the one are respectively equal to three faces similarly placed and including a triedral angle of the other.

3. The angle of two arcs of great circles is equal to the angle of their planes, and is measured by the arc of a great circle described from the vertex as a pole and included between its sides (produced if necessary).

4. The diameter of a sphere is 20 inches. Find its convex surface, its volume, and the area of a zone whose altitude is 20 inches.

The magnitudes of the angles of a triangle upon the above sphere are $85°$, $100°$, and $130°$. Find the area of the spherical triangle in square inches.

PLANE AND SPHERICAL TRIGONOMETRY.

[Those examined only in Plane Trigonometry omitted Questions 6, 7 and 8. Those examined in Trigonometry entire omitted Questions 1 (a) and 5.]

1 (*a*). Express the six trigonometric functions as ratios, and show what function is the reciprocal of each.

(*b*). Show that $\sin(180° - A) = \sin A$, and $\tan(180° - A) = -\tan A$.

2 (*a*). Trace the changes in the sign and value of $\cos A - \sin A$, as A changes from $0°$ to $180°$.

(*b*). Find the six logarithmic functions of $243° \; 25' \; 5''$. What functions of this angle are negative?

3. Two sides of a plane triangle are 10 and 20, and the included angle is $60°$. Find (*a*) the area; (*b*) the remaining side; and (*c*) the remaining angles.

4 (*a*). Prove that $\cos(A+B) = \cos A \cos B - \sin A \sin B$; and hence show that $\cos 2A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$.

(*b*). Obtain the value of $\sin A$ in terms of $\tan A$.

(*c*). If $\tan A = 2\sin A$, find the value of A.

5. In a plane triangle, given $a = 584.7328$, $b = 367.4001$, and $B = 37° \; 42' \; 13''$, find the remaining angles and side.

6. Prove that, in a spherical triangle right-angled at C, $\sin a = \sin A \sin c$.

7. From the formula $\cos a = \cos b \cos c + \sin b \sin c \cos A$, derive the formula

$$\tan \tfrac{1}{2} A = \sqrt{\frac{\sin(s-b) \sin(s-c)}{\sin(s-a) \sin s}}.$$

8. Given $a = 36°$, $b = 49° \; 37' \; 34''$, $c = 76° \; 14' \; 26''$, find A.

ADVANCED ALGEBRA.

1 (*a*). Demonstrate the following formula in Geometrical Progression:

$$S=\frac{a(r^n-1)}{r-1}$$

(*b*). Find the sum of the series $1-\frac{1}{3}+\frac{1}{9}-\frac{1}{27}+ \ldots$ to six terms; also, to infinity. What do you understand by the sum of an infinite series?

2. Reduce $\pi,=\frac{31416}{10000}$, to a continued fraction; and from this, find three successive approximate values of π.

3. Find the number of combinations of ten things, taken four at a time; and give the reasoning.

4. Write and demonstrate the Binomial Formula.

5. By the Method of Differences, find the 101st term of the series 1, 7, 15, 25, 37, . . ; and likewise the sum of the first 101 terms of this series.

6. Express $\frac{4x}{x^2-9}$ as the sum of two fractions whose denominators are $x+3$ and $x-3$, using the Method of Undetermined Coefficients.

7. What is meant by the logarithm of a number n in a system whose base is b? Prove that $\log n$, when the base is b, and $\log b$, when the base is n, are reciprocals of each other.

8. Prove that if r be a value of x that satisfies the equation

$$x^n+Ax^{n-1}+Bx^{n-2}+ \ldots +K=0,$$

then the first member is divisible by $x-r$; and conversely.

9 (*a*). Write the equation whose roots shall be 0, -2, -2, $1+\sqrt{-1}$, and $1-\sqrt{-1}$.

(*b*). What are conjugate imaginaries? Prove that if the equation

$$x^n+Ax^{n-1}+Bx^{n-2}+ \ldots +K=0$$

has imaginary roots, they are in pairs. [The known quantities A, B, . . . K are supposed to be real.]

10. Find a commensurable root of the equation $x^4+2x^3-x^2+35x+37=0$, then depress the degree of the equation, and find an incommensurable root to three decimals.

DEGREES AND PRIZES.

ORDER OF EXERCISES AT THE TENTH ANNUAL COMMENCEMENT.

THURSDAY, JUNE 20, 1878.

The Lord's Prayer.

1. ORATION: Inspirers and Organizers in History,
EUGENE CARY, *Dunkirk*
2. *THESIS IN AGRICULTURE: Rotation in Crops,
BENTO DE ALMEIDA PRADO, *Itù, S. Paulo, Brazil*
3. THESIS IN NATURAL HISTORY: The Native Races of Central America, FRED BAKER, *Norwalk, Ohio*
4. *THESIS IN CIVIL ENGINEERING: Design for a Railroad Bridge, DAVID MARX, *Toledo, Ohio*
5. *THESIS IN MECHANIC ARTS: The Reynolds 8-Ton Hoisting Machine, ARTHUR FALKENAU, *New York City*
6. *ESSAY IN LITERATURE: Superstition among the Men of Letters in Ancient Rome,
RUTH PUTNAM, *New York City*
7. ESSAY: Technical Education,
ROBERT HENRY TREMAN, *Ithaca*
8. ORATION: The Elevation of Labor,
WATSON WEED, *North Rose*
9. ESSAY: Theodore Winthrop and his Writings,
HEYWOOD CONANT, *Wilmington, Del.*
10. *THESIS IN MECHANIC ARTS: The Steam-engine Indicator, FREDERIC ARTHUR HALSEY, *Unadilla*
11. *THESIS IN ARCHITECTURE: Swiss Architecture,
QUINTILIANO NERY RIBIERO, *Minos-Geraes, Brazil*
12. ORATION: The Evolution and Power of Ideas,
JOSEPH NESS, *Hoopeston, Ill.*
13. *THESIS IN CHEMISTRY: Malt Liquors and their Chemical Relations, CLAYTON CRANDALL, *Ithaca*
14. ESSAY: The Economic Conditions of Railway Location,
CORNELIUS STEPHENS THACHER, *Hopewell*

15. *THESIS IN SCANDINAVIAN LITERATURE: Tegner's Frithiof's Saga,
ARTHUR MIDDLETON REEVES, *Richmond, Ind.*
16. ORATION: Communism in America,
ARTHUR COOPER WAKELEY, *Omaha, Neb.*
17. LITERARY ESSAY: Woman in Tennyson,
CHARLES MYRON REXFORD, *Watertown*
18. *THESIS IN CIVIL ENGINEERING: English and American Iron Bridges,
FRANK EDWARD BISSELL, *South Bend, Ind.*
19. *THESIS IN MODERN LANGUAGES: The Origin of the Italian Language, JOHN WESLEY BABCOCK, *Jamestown*
20. *THESIS IN ANCIENT LITERATURE: Aristophanes and Roman Satire,
ARTHUR LUDWIG KARL VOLKMANN, Arch.B., *New York City*
21. THE WOODFORD ORATION: Individual Manhood as an Influence in History,
CHARLES WILBERFORCE AMES, *Germantown, Pa.*

Presentation of Prizes.

Conferring of Degrees and Certificates by the Acting President.

BENEDICTION.

*Not read.

DEGREES CONFERRED IN 1878.

The following is a list of those who received degrees at the annual Commencement at the close of the tenth academic year, together with the degrees conferred and the residence of each recipient:—

FIRST DEGREES.

BACHELORS OF ARTS, (9).

JOHN WESLEY BABCOCK,	Jamestown.
DANIEL WAYLAND CADY,	Peterborough.
BESSIE BELL DE WITT,	Owego.
MARGARET HICKS,	Syracuse.
KIT MC EBRIGHT,	Akron, O.
WILLIAM LINCOLN MC KAY,	Des Moines, Ia.
CHARLES MYRON REXFORD,	Watertown.
ELIAS HORNING SELLERS,	Fentonville, Mich.
ARTHUR LUDWIG KARL VOLKMANN, Arch.B.,	New York City.

BACHELORS OF LITERATURE, (3).

CHARLES WILBERFORCE AMES,	Germantown, Pa.
RUTH PUTNAM,	New York City.
ARTHUR COOPER WAKELEY,	Omaha, Neb.

BACHELORS OF PHILOSOPHY, (2).

JACOB SCHWARTZ LEHMAIER,	New York City.
MARY ELLEN OLIVER,	Lynn, Mass.

BACHELORS OF SCIENCE, (24).

In Science and Letters, (18).

EUGENE BAKER,	Ithaca.
ALFRED HOVEY BALLARD,	Syracuse.
SAMUEL THRUSTON BALLARD,	Louisville, Ky.
PHILIP BARNARD,	Lake View, Ill.
EUGENE CARY,	Dunkirk.
HEYWOOD CONANT,	Wilmington, Del.
GEORGE PENSTON EATON,	Oxford.
CHARLES BROWN EVERSON,	Syracuse.
LIZZIE JANE GIDDINGS,	Jefferson, O.
LISETTE FRANCES JONES,	Ilion.
FRANKLIN MASON KENDALL,	Attica.
FRANK OLIVER MEEKER,	Franklin, W. T.
JOSEPH NESS,	Hoopeston, Ill.
WILLIAM BERNICE PATTIN,	Fort Plain.
WILLIAM PASSMORE PICKETT,	Litchfield, Ct.
ARTHUR MIDDLETON REEVES,	Richmond, Indiana.
HENRY JUSTIN VAN NORMAN,	Jasper.
WATSON WEED,	North Rose.

In Physical Science, (1).

FRANKLIN WESTON MANN,	Norfolk, Mass.

In Chemistry, (3)

CLAYTON CRANDALL,	Ithaca.
SAMUEL GATFIELD DEWSNAP,	Middletown.
WILLIAM KEITH,	Warsaw.

In Natural History, (2).

FRED BAKER,	Norwalk, O.
ARTHUR EUGENE BEARDSLEY,	Cayuga, Ill.

BACHELOR OF AGRICULTURE, (1).

Bento de Almeida Prado,	Itù, S. Paulo, Brazil.

BAGHELORS OF ARCHITECTURE, (2).

Edward Green,	Utica.
Quintiliano Nery Ribeiro,	Minos-Geraes, Brazil.

BACHELORS OF CIVIL ENGINEERING, (14).

Willard Beahan,	Watkins.
Frank Edward Bissell,	South Bend, Ind.
Frank Bruen,	Dayton, O.
James Dyson,	New Britain, Ct.
Edward Hayes,	Cohoes.
George Milton Jarvis,	Canastota.
David Marx,	Toledo, O.
Frank Adams Maxwell,	Clymer.
Cyrus Hall Mc Cormick,	Henderson, Ky.
Thomas Davis Merrill,	Saginaw City, Mich.
Edward Livermore Preston,	Grinnell, Ia.
Francisco Valdes Rodriguez,	Havana, Cuba.
Cornelius Stephens Thacher,	Hopewell.
Philip Albert Welker,	Toledo, O.

BACHELORS OF MECHANICAL ENGINEERING, (12).

James Mc Kee Borden,	Washington, D. C.
Ellwood Burdsall,	Port Chester.
Arthur Falkenau,	New York City.
Frederic Arthur Halsey,	Unadilla.
Forbes Heermans,	Syracuse.
John Thomas Hill,	Warren, Pa.
Ben Johnson,	Ithaca.
William Kelly Seaman,	Newburgh.
Albert William Smith,	Westmoreland.
Robert Henry Treman,	Ithaca.
Augusto Cezar de Vasconcellos,	Rio de Janeiro, Brazil.
Wallace Jay Wilcox,	Ithaca.

SECOND DEGREES.

MASTER OF ARTS, (1).

Mary H. Ladd, A.B.,	Cornell.

CIVIL ENGINEERS, (2).

Irving P. Church, B.C.E.,	Cornell.
Charles W. Raymond, B.C.E.,	Cornell.

LICENTIATES.

IN PHYSIOLOGICAL ANATOMY, (1).

WILLIAM S. GOTTHEIL, New York City.

IN MINERALOGY AND ASSAYING, (1).

FRANCIS M. WILSON, Ithaca.

PRIZES AWARDED.

The following is a list of prizes awarded in the University during the tenth academic year—1877–8:

1. Woodford prize—a gold medal—Charles W. Ames.
2. First Horace K. White prize in Veterinary Science, twenty dollars, John H. Weinmann.
3. Second Horace K. White prize in Veterinary Science, ten dollars, W. N. D. Bird.
4. Prizes of the Early English Text society:

First prize, George L. Burr.
Second prize, Harriet Heyl.

PRIZES FOR UNDERGRADUATES.

The following prizes are offered for the year 1878–9:

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford prize the present year are as follows:

1. Public Spirit in the Scholar.
2. Hamlet and Orestes.
3. Toussaint L'Ouverture and Napoleon Bonaparte.
4. Popular Delusions.
5. The Debt of Great Men to Associates and Compeers.

6. The Monk Augustin in the Sixth Century and Livingstone in the Nineteenth.
7. Sentimental and Scientific Philanthropy.
8. "The Good and Noble Masters" whom a man is to please.

THE HORACE K. WHITE PRIZE.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars;* to the second in merit, *Ten Dollars.*

EARLY ENGLISH TEXT AND SHAKSPERE SOCIETY PRIZES.

These prizes consist of the publications of the two societies above named respectively. The number of prizes is not limited. but depends on the number of students in the Special English Literature classes, and the award of the prizes is based on the general work done by the students in the department.

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

ARTICLE I.

1. There shall be two standing committees, an executive committee and an auditing committee.

2. The executive committee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

4. The order of business at each regular meeting shall be as follows:—

(*a*) The secretary shall ascertain the names of the members present by roll call or otherwise.

(*b*) Reading the minutes of the last meeting.

(*c*) Treasurer's report and the referring of it to the auditing committee.

(*d*) Report of the executive committee.

(*e*) Reports of special committees.

(*f*) Miscellaneous business.

(*g*) Election of officers and committees.

(*h*) Election of Trustee or Trustees.

(*i*) Adjournment.

ARTICLE 2.

1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not herein before provided for, shall be elected as follows: The president by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of New York, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1878–9.

President—E. F. ROBB, '70.

Vice-Presidents—C. F. HENDRYX, '69; C. J. POWERS, '70; A. N. FITCH, '71; G. A. ISELIN, '72; R. BACON, '73; H. L. FAIRCHILD, '74; J. T. NEWMAN, '75; C. T. BREWER, '76; C. S. COBB, '77.

Recording Secretary and Treasurer—W. R. LAZENBY, '74.

Corresponding Secretary—M. VAN CLEEF, '74.

Executive Committee—M. VAN CLEEF, and W. R. LAZENBY, *ex officio*, and W. H. SMITH, E. A. WAGENER, H. W. FOSTER.

Auditing Committee—G. B. TURNER, R. G. H. SPEED, and J. S. COON.

Orator—G. H. FITCH, '75; Alternate, H. V. L. JONES.

Poet—W. R. DUDLEY, '74; Alternate, F. D. CARPENTER.

Essayist—M. H. LADD, '75; Alternate, Mrs. R. H. WILES.

TRUSTEE ELECTED.

HON. CHARLES C. DWIGHT.

MEMBERS OF THE ASSOCIATION.

GRADUATED IN 1869. [8]

* The star denotes deceased graduates.

G. F. Behringer, A. B.
M. B. Buchwalter, A. B.
J. B. Foraker, A. B.
C. F. Hendryx, A. B.
J. Kirkland, A. B.
J. A. Rea, A. B.
D. W. Rhoades, A. B.
O. F. Williams, A. B.

GRADUATED IN 1870. [24]

A. A. Andrews, B. S.
S. S. Avery, B. S.
J. S. Butler, B. S.
J. J. Chambers, Ph. B.
T. B. Comstock, B. S.
B. V. B. Dixon, A. B.
E. Douglas, A. B.
H. T. Eddy, C. E., (Ph. D., '72).
A. R. Greene, A. B.
S. D. Halliday, A. B.
E. D. Jackson, Ph. B.
H. V. L. Jones, Ph. B.
G. H. Lothrop, Ph. B.
G. M. Luther, B. S.
J. L. Maxwell, Ph. B.
P. Mosher, A. B.
C. J. Powers, B. S,
C. L. Powers, B. S.
E. F. Robb, A. B.
M. M. Ross, B. S.
P. G. Schoeder, Ph. B.
T. W. Spence, A. B.
C. A. Storke, A. B.
F. Walters, Ph. B.

GRADUATED IN 1871. [40]

W. S. Barnard, B. S.
L. H. Barnum, Ph. B.
G. A. Benton, A. B.
P. C. J. De Angelis, A. B.
A. B. Doerflinger, B. C. E.

A. H. Edgren, Ph. B.
W. Farnham, B.C. E., (C. E.,'74).
A. N. Fitch, Ph. B.
O. Gillett, B. C. E.
E. J. Hadley, B. S.
W. H. Hayes, B. S.
I. Hoagland, B. S., (Ph. B., '72).
S. F. Huntley, B. S.
K. W. Ingham, Ph. B.
G. W. Ingraham, A. B.
M. Kasson, B. V. S.
R. O. Kellogg, Ph. B.
E. D. Leffingwell, B. S.
J. J. Lockhart, B. S.
J. M. McNair, B. S.
W. S. McGregor, B. S.
J. E. More, A. B.
M. J. Morse, Ph. B.
J. O'Neill, A. B.
E. L. Parker, A. B.
C. E. Reeves, B. S.
F. H. Remington, B. S.
A. J. Rogers, Ph. B.
W. P. Ryman, B. S.
S. W. Salmon, B. C. E.
F. Schoff, B. C. E.
A. H. Sewell, B. S.
F. Sherman, B. S.
G.L.T.Smith, B.C.E., (C.E.,'74).
M. A. Smith, B. C. E.
R. G. H. Speed, Ph. B.
R. Taft, B. S.
W. H. Tallmadge, A. B.
C. E. Van Cleef, B. S.
W. DeL. Wilson, A. B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph. B.
M. C. Bean, B. C. E.
C. H. Blair, A. B. A.M.,'76).
D. W. Bowman, B. C. E.
E. L. Brady, B. S.
G. F. Breed, Ph. B.
H. S. Buffum, B. S.
J. M. Chase, B. S.
I. E. Clark, B. C. E.
A. C. Clement, B. S.
A. W. Clinton, B. S.
D. Colburn, B. C. E.
M. T. Conklin, B. S.
H.E.Copeland, Ph.B.,(M.S., '75).
C. L. Crandall,(C.E.,'76).
C. S. Crofoot, Ph. B.
Gram Curtis, B. C. E.
D. M. Darrin, B. S.
L. A. Foster, B. S.
F. W. Frost, B. C. E.
A. N. Fuller, B. S.
W. Harkins, B. S., (B. Lit., '73).
R. Headley, B. S.
H. C. Henderson, B. C. E.
I. N. L. Heroy, B. S.
W. E. Holcomb, B. S.
F. Holden, A. B.
R. B. Howland, B. C. E.
J. H. Hurd, B. S.
E. W. Hyde, B. C. E., (C. E.,'74).
G. A. Iselin, B. S.
D. S. Jordan, M. S.
L. F. Judson, B. S.
M. Kellogg, B. S.
J. B. Lawrence, Ph. B.
W. N. B. Lawton, Ph. B.
W. B. Leach, B. S.
J. W. Mack, B. S.
J. T. McCollum, B. S.
T. J. McConnon, B. S.
E. E. McElroy, B. S.
F. D. Nash, B. S.
E. Nicoll, B. S.
W. H. Niles, B. S.
A. Osborn, A. B.
D. M. Page, B. S.
M. G. Peters, B. S.
A. C. Pike, B. S.
G. W. Pitts, B. S.
*H. G. Pollock, B. S.
C. S. Price, B. C. E.
A. L. Rader, Ph. B.
A. Rogers, B. C. E.
D. E. Salmon, (D.V.M.,'76).
T. Sanderson, A. B.
W. I. Scott, B. S.
G. P. Serviss, B. S.
C. B. Sill, B. C. E.
*C. Smith, B. S.
L. P. Smith, B. S., (Ag. B., '74)

M. G. Stolp, B. C. E.
S. P. Thomas, B. C. E.
J. E. Van De Carr, B. S.
J. DeW. Warner, Ph. B.
A. C. Weeks, B. S.
S. N. Williams, B. C. E.
E. V. Wilson, B. S.
T. H. Wolford, B. S.
W. J. Youngs, B. S.

GRADUATED IN 1873. [95]

C. F. Allen, B. C. E.
H. Altman, B. S.
R. Anderson, B. M. E.
J. C. Averill, B. S.
A. B. Aubert, B. S.
R. Bacon, B. S.
E. Bartley, B. S.
S. F. Belknap, B. S.
H. E. Blake, B. C. E.
L. G. Boies, A. B.
I. W. Boothby, B. S.
S. W. Brown, B. S. (C.E.,'76).
Frank Carpenter, B. C. E.
F. H. Carver, B. S.
A. B. Cauldwell, B. S.
J. Chamberlin, B. S.
J. P. Church, B. C. E.
J. T. Cothran, A. B.
W. H. Denham, B. S.
O. A. Derby, B. S., (M. S., '74).
Geo. Devin, B. C. E.
*E.T. Diefendorff, B. S.
E. G. Donaldson, B. Lit.
G. F. Dudley, B. S.
W. F. Duncan, B. S.
E. S. Eastman, Ph. B.
L. Elsbree, A. B.
L. Everett, B. S.
J. B. Ewell, B. S.
L. Falkeneau, B.C.E. (C.E.,'77).
F. B. Ferriss, B. S.
P. D. Finnegan, A. B.
C. Finster, A. B.
N. K. Foster, B. S.
J. Frankenheimer, Ph. B.
M. R. Frazer, A. B.
A. Gridley, B. S.
F. N. Hagar, A. B.
F. W. Halsey, B. S.
G. W. Harris, Ph. B.
A. C. Harwick, B. S.
J. W. Hill, B. M. E.
G. W. Horner, B. C. E.
E. M. Howard, B. S.
A. T. Hyde, B. C. E.
H. C. Johnson, A. B.
*F. H. Jones, B. Lit.
C. S. Joy, A. B.
F. W. Kelley, A. B., (Ph.D., '74).
W. L. Klein, B. S.
F. J. Knight, B. C. E.
J. M. Knowles, B. S.
D. E. Kohler, A. B.
C. Y. Lacy, Agr. B.
C. F. Lane, A. B.
D. T. Lawson, B. C. E.
W. Leland, B. S.
C. E. Lipe, B. M. E.
R. H. Lockwood, B. C. E.
G. F. Lyman, B. C. E.
D. W. J. Mesick, B. S.
J. L. Moffatt, B. S.
J. G. Moore, A. B.
G. C. Morehouse, B. S.
W. T. Morris, B. S.
J. G. Newkirk, A. B.
C. D. Page, B. S.
R. Parmely, B. S.
F. Parson, B. C. E.
G. E. Patrick, B. S., (M. S., '74).
G. H. Phelps, B. S.
A. H. Phinney, (B. S.,) Ph. D.
*K. Preston, B. C. E.
F. W. Proctor, B. S.
F. J. Root, B. C. E.
J. R. Schoonover, Arch. B.
E. H. Scofield, A. B.
J. F. Seybolt, B. S.
M. C. Sharp, Ph. B.
M. A. Shotwell, Ph. B.
C. D. W. Smith, B.S., (M.S., '75).
C. L. Smith, B. S.
S. Smith, B. S.
W. H. Smith, A. B.
H. L. Sprague, B. S.
W. L. Sprague, A. B.

H. D. Stevens, B. S.
G. A. Tilley, B. C. E.
W. Tinning, B. S.
J. H. Tompkins, B. C. E.
G. B. Turner, B. S.
M. W. Van Auken, A. B.
C. F. Wheelock, B. S.
T. S. White, B. C. E.
T. Worthington, Ph. B.

GRADUATED IN 1874. [64].

F. B. Alexander, B. C. E.
Geo. Berry, Arch. B. (Arch.,'76)
N. W. Cady, Ph. B.
C. W. Candee, B. S.
J. D. Case, B. S.
J. F. Cluck, A. B.
J. H. Comstock, B. S.
F. W. Cooper, Arch. B.
O. H. P. Cornell, C. E.
J. A. Dobroluboff, B. C. E.
W. R. Dudley, B. S. (M.S.,'76)
H. L. R. Fairchild, B. S.
W. R. Fitch, B. C. E.
S. P. Fleming, A. B.
W. H. Flint, A. B.
R. B. Foster, B. C. E. (C.E.,'77)
L. M. Fulton, B. S.
Wallace Green, B. C. E.
H. M. Gillett, B. S.
T. Hampson, Lit. B.
J. T. Hay, B. S.
B. A. Hayes, Lit. B.
L. T. Henderson, Ph. B.
H. M. Hibbard, B. C. E.
H. L. House, A. B.
J. T. Hurd, B. S.
W. H. Janney, B. C. E.
E. F. P. Jordao, B. C. E.
W. A. Kellerman, B. S.
H. M. Kennedy, Lit. B.
B. W. Law, Arch. B.
C. H. Lay, B. C. E.
W. R. Lazenby, Agr. B.
H. G. Northrup, B. C. E.
J. H. Pierce, B. S.
E. M. Pitts, B. S., (M. S '75).
C. A. Preston, B. S.
C. H. Ramsay, B. S.
E. O. Randall, Ph. B.
W. M. J. Rice, Arch. B.
H. B. Robinson, B. C. E.
B. E. Shear, Arch. B.
G. S. Sheppard, B. S.
W. M. Smith, B. S.
W. N. Smith, B. M. E.
C. W. Soulby, B. S.
J. H. Southard, B. S.
A. C. Standart, B. S.
J. L. Stone, Agr. B.
W. Swaty, B. S.
W. P. Thompson, B. S.
L. P. Tier, B. C. E.
S. E. Todd, Arch. B.
F. C. Tomlinson, B. C. E.
G. B. Upham, B. S.
J. D. Upham, B. S.
M. Van Cleef, B. S.
G. R. Van De Water, B. S.
C. W. Wasson, B. C. E.
F. W. Warthorst, B. C. E.
R. H. Wiles, B. S.
G. T. Winston, Lit. B.
C. C. Wood, B. S.
F. C. Wood, B. S.

GRADUATED IN 1875. [52].

W. O. Bates, Ph. B.
A. A. Beattie, B. M. E.
H. P. Bellows, B. S.
E. T. Betts, B. S.
A. R. Bradford, B. S.
A. W. Bulkley, Arch. B.
S. J. Bunting, B. M. E.
C. F. Burt, B. S.
S. W. Carpenter, Ph. B.
I. N. Cook, B. C. E.
E. Corson, B. S.
V. L. Davey, A. B.
J. W. Dean, B. S.
O. W. Ferguson, B. C. E.
G. H. Fitch, B. S.
E. L. B. Gardiner, B. M. E.
E. George, B. C. E.
A. R. Gillis, B. M. E.
A. C. Green, B. C. E.

C. S. Harmon, B. S.
O. Harris, B. S.
F. Hatch, A. B.
F. H. Hiscock, A. B.
D. R. Horton, B. S.
I. E. Hutton, Arch. B.
E. Jackson, B. S.
C. C. King, Arch. B.
H. B. Knight, A. B.
M. H. Ladd, A. B.
M. D. Makepeace, B, C. E.
G. S. Moler, B. M. E.
J. T. Newman, Ph. B.
E. L. Nichols, B. S.
P. H. Perkins, B. C. E.
E. D. Preston, B. C. E.
E. J. Preston, B. S.
H. H. Roberts, Ph. B.
E. K. Rossiter, Arch. B.
H. W. Sackett, A. B.
A. F. Shaw, B. S.
F. W. Simonds, B. S. (M. S., '76).
F. P. Smith, B. S.
F. P. Stevens, B. S.
W. M. Sturges, Agr. B.
G. Tatnall, B. C. E.
J. J. Thomas, A. B. (A. M., '76).
G. R. Thompson, B. S,
W. J. Thompson, B. S.
D. J. Tomkins, Ph. B.
V. S. Walsh, B. S.
F. P. Wheeler, B. S.
J. Worthington, A. B.

GRADUATED IN 1876. [65]

J. M. Ashley, B. S.
C. P. Aylen, B. C. E.
C. Barclay, B. S.
Carlos P. de Barros, B. C. E.
W. J. Berry, A. B.
G. Boardman, B. M. E.
C. T. Brewer, Ph. B.
J. T. Brown, B. M. E.
F. de A. V. Bueno, B. C. E.
J. K. Cady, Arch. B.
C. F. Carpenter, B. M. E.
E. F. Church, B. M. E.
M. R. Conable, B. C. E.
C. B. Coon, B. S.
S. H. Coon, A. B.
E. L. Crandall, B. S.
S. S. Eddy, B. S.
*A. F. Eidlitz, B. C. E.
C. H. Esty, A. B.
W. F. Farmer, B. C. E.
D. F. Flannery, B. S.
C. W. Foote, A. B., M. A., (Ph. D, '77.)
A. W. Foster, A. B., M. A.
E. Frayer, A. B. (A. M., '77).
M. M. Garver, B. S.
H. McC. Hadley, Arch. B.
F. E. Heath, B. S.
A. Z. Kent, B. M. E.
W. H. Kent, B. S.
F. Looney, B. S.
A. E. Maltby, B. C. E.
W. G. McDowell, A. B
J. C. McMullen, B. C.
R. L. Moore, B. S.
F. W. Noyes, Ph. B.
L. B. Palmer, B. S.
W. H. Parker, Arch. B.
C. R. Parkhurst, B. S.
J. Parmelee, B. S.
C. W. Raymond, B. C. E.
H. J. Rice, B. S.
W. K. Roy. B. S.
H. A. Rueppele, B. S.
H. Russel, A. B.
C. F. Saunders, Arch. B.
H. B. Seeley, Arch. B.
H. H. Seymour, B. S.
T. Stanton, A. B. (A. M., '77).
J. H. Stubbs, B. C. E.
J. W. Sturdevant, B. S.
S. P. Sturges, A. B.
W. P. Sturges, B. S.
J. B. Tarleton, Arch. B.
F. E. Taylor, B. M. E.
H. Terry, B. S.
E. D. Thompson, B. C. E.
H. C. Tilden, Lit. B.
C. A. Van Velzer, B. S.
E. A. Wagner, B. S.
C. E. Washburne, Ph. B.
C. B. Wheelock, B. C. E.

C. H. Willmarth, Agr. B. (M. S., '77).
C. P. Woodruff, B. S.
R. Yatabe, B. S.
F. O. Young, B. S.

GRADUATED IN 1877.

W. C. Ames, B. C. E.
J. Aylen, B. C. E.
A. F. Balch, Arch. B.
C. M. Bean, Agr. B.
J. B. Beatty, B. S.
W. E. Bramhall, B. C. E.
Ida Bruce, A. B.
A. S. Carman, B. S.
P. D. Clark, Ph. B.
C. S. Cobb, B. S.
C. M. Cooper, B. S.
J. S. Coon, B. M. E.
F. D. Crim, B. S.
W. L. Deming, Arch. B.
W. E. Dennis, B. S.
W. R. Dobbyn, Lit. B.
L. Eidlitz, B. M. E.
H. W. Foster, A. B.
A. E. Frota, B. C. E.
S. H. Gage, B. S.
W. Gentleman, B. S.
W. S. Gifford, B. S.
G. W. Gillett. Ph. B.
B. H. Grove, A. B.
M. E. Haviland, B. S.
F. B. Hine, B. S.
L. O. Howard, B. S.
D. W. King, Arch. B.
W. E. Lape, B. M. E.
A. J. Loos, B. S.
W. E. Lucas, Ph. B.
D. J. Macpherson, B. C. E.
C. B. Mandeville, B. S.
L. M. Mann, B. C. E.
A. B. McNairy, B. M. E.
T. L. Mead, B. C. E.
J. S. Milford, B. S.
D. C. Moraes, B. C. E.
C. T. Mould, Arch. B.
I H. Myers, B. S.
E. O'Niel, Ph. B.
J. N. Ostrom, B. C. E.
F. Outerbridge, B. M. E.
E. H. Palmer, B. S.
F. Patrick, Ph. B.
T. B. Peck, Arch. B.
F. M. Pennock, Agr. B.
H. Russel, (A. B.) Arch. B.
F. V. D. Sanford, B. S.
E. J. Sellew, A. B.
E. D. Sherman, B. S.
W. J. Sherman, B. C. E.
M. J. Sinton, B. S.
E. R. Smith, B. C. E.
S. M'K. Smith, Ph. B.
J. C. H. Stevenson, Ph. B.
H. Thomas, B. C. E.
M. C. Thomas, A. B.
W. B. Throop, B. C. E.
A. S. Tibbets, B. C. E.
H. H. Tyndale, B. S.
E. M. Van Dusen, Lit. B.
D. F. Van Vleet, B. S.
J. Viegas-Munis, B. C. E.
A. L. K. Volkman, Arch. B.
E. L. Ware, B. M. E.
J. S. Waterman, B. M. E.
F. P. Weeks, B. S.
H. S. White, B. S.
C. F. Wilson, Ph. B.

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C. W. Ames, Lit. B.
J. W. Babcock, A. M.
E. Baker, B. S.
F. Baker, B. S.
A. H. Ballard, B. S.
S. T. Ballard, B. S.
P. Barnard, B. S.
W. Beahan, B. C. E.
A. E. Beardsley, B. S.
F. E. Bissell, B. C. E.
J. M. Borden, B. M. E.
F. Bruen, B. C. E.
E. Burdsall, B. M. E.
D. W. Cady, A. B.
E. Carey, B. S.
H. Conant, B. S.
C. Crandall, B. S.

S. G. Dewsnap, B. S.
B. B. DeWitt, A. B.
J. Dyson, B. C, E.
G. P. Eaton, B. S.
C. B. Everson, B. S.
A. Falkenau, B. C. E.
L. J. Giddings, B. S.
E. Green, Arch. B.
F. A. Halsey, B. M. E.
E. Hayes, B. C. E.
F. Heermans, B. M. E.
M. Hicks, A. B.
J. T. Hill, B. M. E.
G. M. Jarvis, B. C. E.
B. Johnson, B. M. E.
L. F. Jones, B. S.
W. Keith, B. S.
F. M. Kendall, B. S.
J. S. Lehmaier, Ph. B.
F. W. Mann, B. S.
D. Marx, B. C. E.
F. A. Maxwell, B. C. E.
C. H. McCormick, B. C. E.
K. McEbright, A. B.
W. L. McKay. A. B.
F. O. Meeker, B. S.
T. D. Merrill, B. C. E.
J. Ness, B. S.
M. E. Oliver, Ph. B.
W. B. Pattin, B. S.
W. P. Pickett, B. S.
B. de A. Prado, Agr. B.
E. L. Preston, B. C. E.
R. Putnam, Lit. B.
A. M. Reeves, B. S.
C. M. Rexford, A. B.
Q. N. Ribiero, Arch. B.
F. V. Rodriguez, B. C. E.
W. K. Seaman, B. M. E.
E. H. Sellers, A. B.
A. W. Smith, B. M. E.
C. S. Thacher, B. C. E.
R. H. Treman, B. M. E.
H. J. Van Norman, B. S.
A. C. de Vasconcellos, B. M. E.
A.L.K.Volkmann, Arch.B. A. B.
A. C. Wakeley, Lit. B.
W. Weed, B. S.
P. H. Welker, B. C. E.
W. J. Wilcox, B. M. E.

Preparatory School.

The Calendar of the **Preparatory School** *conducted by Professors* MacKoon *and* Wait *is the same as that of the Cornell University, with one term additional beginning in June, on the Wednesday following the annual Commencement of the University.*

Thorough instruction is given, to classes, or to single pupils, in the studies of any of the preparatory courses, and in the Languages and Mathematics required in any of the departments of the University. Inquiries may be addressed to either of the undersigned, Ithaca, N. Y.

B. P. MacKoon. L. A. Wait.